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The conflicting goals of national energy policy

ROBERT E. HALL & ROBERT S. PINDYCK

NATIONAL energy policy faces a deep conflict in objectives, which has been a major reason for the failure to adopt rational measures: Consumers want cheap energy, but producers need high prices to justify expanded production. So far the goal of low prices has dominated. Through a combination of measures, some longstanding and some thrown together quickly during the energy crisis of 1974, the price of energy to consumers in the United States has been held far below the world level. Domestic producers have been prohibited from taking advantage of the higher world price, and in the case of oil, a heavy tax has been imposed on domestic production to finance the subsidization of imports. These steps have caused demand to increase more rapidly than production, and energy imports have risen to fill the gap. If recent policies are continued, imports will continue to grow. Some painful choices regarding the objectives of energy policy will force themselves upon the United States in the next few years.

The economics of the nation's energy problem involves little more than the principle that higher prices result in less demand and more supply. The exact size and timing of the effects of price on demand and supply are still open to debate, but a summary of recent evidence indicates that demand falls by about one per cent for each four-per-cent increase in price, and supply rises by about one per cent

for each five-per-cent increase in price. Of course several years must pass before demand and supply fully respond to changes in price, and there is some uncertainty over the magnitude and speed of the supply response, but these numbers provide a reasonable basis for an initial description of the energy market in the United States. Policies in effect today have depressed the domestic price of energy, on the average, by about 30 per cent below the world price. Consumption, then, is about eight-per-cent higher than it would be otherwise, and supply is about six-per-cent lower. Stated in oil-equivalents, the total consumption of energy in the United States is about 38 million barrels per day: 31 million barrels are filled by domestically produced oil, natural gas, and coal, and the rest is imported. Eight per cent of consumption is just over three million barrels per day, and six per cent of domestic production is just under two million barrels, so the policy of depressing prices has the net effect of increasing imports by about five million barrels. But current imports are around seven million barrels per day, so a striking conclusion emerges from these simple calculations: *The problem of rising imports is largely of our own making.* Imports might well be much lower had our energy policy not been based on maintaining low prices.

Why did we inflict these policies on ourselves if they alone are largely responsible for the problem of growing imports? It is not that policy-makers are ignorant of the simple economics of supply and demand, nor even that they underestimated the size of the price effects. Instead, these policies have been moved by the desire to prevent consumer prices from rising, and to block the windfall gains that would otherwise have accrued to producers when world energy prices rose so dramatically in 1973-74, and that would have come directly out of the pockets of consumers. The stimulus to imports has simply been a byproduct of these anti-windfall measures. The paramount goal has been to prevent a wholesale redistribution of income from 215 million energy consumers, many of whom are not very well off, to a handful of producers, most of whom are quite well off. Our policies have achieved this goal, at least in part, and are unlikely to be displaced by alternatives that fail to recognize its extreme importance to the American public.

How current policies keep energy prices low

Two major policies have primarily been responsible for the current large gap between the world and domestic prices of energy.

The first and more important has the general effect of taxing domestic production of crude oil, and then using the proceeds to subsidize imports, with no net effect on the federal budget. This ingenious policy was conceived and executed in a matter of months in 1974, operates today in a somewhat strengthened form, and is scheduled for demise in 1979. Under its provisions, the Federal Energy Administration sets an average price that domestic producers may receive for their oil (currently $7.66 per barrel). In order to refine domestic crude oil, producers must purchase a ticket called an entitlement, at a cost of approximately $2.00 per barrel. This is the tax on domestic production. On the other hand, refiners who import their crude oil at the world price of about $12.50 per barrel receive entitlements worth about $3.00 per barrel. This is how imports are subsidized. Either way, the effective cost of oil to refiners is the same, $9.50 per barrel. If this system were eliminated today, domestic producers of crude oil would receive the world price (which would mean an increase of about $5.00, or 65 per cent above what they currently get)—which would, after two or three years, increase the domestic supply of oil by about 13 per cent. The cost of oil to refiners would rise by about 32 per cent, and these higher costs would be passed on to consumers. Price increases to consumers would depend on the particular petroleum product; retail gasoline prices, for example, would increase by about seven or eight cents per gallon.

It is ironic that the desire to limit the flow of income from consumers to producers has the side effect of putting the United States government in the business of subsidizing oil imports, a large part of which come from the Organization of Petroleum Exporting Countries (OPEC)—the villain of the price increase in the first place. But the government is incapable of dictating the selling price of oil produced outside the United States, and as long as the domestic price is controlled and imports fill the gap between domestic production and demand, a subsidy for imports is a logical necessity. As imports continue to grow, greater and greater strains will be placed on the tax and subsidy program. As the total dollar volume of the subsidy increases and the domestic base for the tax shrinks, some revenue from the federal budget will ultimately be required to continue the program—unless the average domestic price for oil is allowed to rise. The planned elimination of the program early in 1979 seems problematical from the perspective of today. The powerful forces that brought the policy into being in 1979 will certainly not have disappeared, and no matter what the state of our economy is in

1979, it will be argued that it is too fragile to sustain the shock of increased oil prices. Government manipulation of oil prices may well turn out to be a permanent feature of the United States economy.

The second major policy directed at maintaining a low domestic price of energy is the long-standing regulation of the price of natural gas by the Federal Power Commission (FPC). The average price of natural gas at the wellhead has for a long time been held far below the world level, which resulted in domestic shortages of natural gas well before the 1973 oil embargo. This policy substantially subsidizes the consumption of natural gas by those who are able to obtain it (mainly households, but also industries in some parts of the country). Those unable to obtain natural gas must shift their demand to oil or electricity. The effect has been to increase the demand for energy by about one or two million barrels of oil-equivalents per day—a major contribution to the import problem. This price policy has also limited the supply of natural gas, since even the prices for new contracts have been held well below world levels. It is likely that the FPC will significantly increase new contract prices—but probably not to the world level—and average wellhead prices will rise only slowly as old contracts expire. There has been little progress in deregulation, again because it entails the redistribution of income from consumers to producers.

Where is national energy policy headed? In the next two or three years, it will be necessary to resolve the conflict between low prices and self-sufficiency. Adopting inappropriate and costly programs is as risky as failing to adopt economically sensible programs.

What energy policy should not do

Continuing the present policies that keep the price of energy artificially low is likely to draw two undesirable responses from policy-makers. First, there will be growing pressure to control energy consumption by other means than price increases. Various schemes are likely to be devised, including controls on the use of heating and lighting, and on the types of cars that can be bought and the speeds at which they can be driven. So far, we have tried only the increasingly unpopular and unenforced speed-limit reduction, and have announced fuel-mileage requirements for cars built in the future. Pressure will mount to impose further controls as imports grow. Proponents of such measures label them as "conservation," but that is not a fair use of the term. The energy crisis has long since eliminated much of the pure waste of energy that previously

occurred, and most of what still remains largely results from selling energy at a price well below its true value. Controls unnecessarily circumscribe individual choice, leaving people worse off by making their lives colder and dimmer and limiting their ability to travel. The problems of enforcing the 55-mile-an-hour speed limit call attention to the difficulty of limiting demand below the level that people would freely choose, given the price of energy. It is not realistic to project large savings from legislating reduced temperatures in homes or offices, or reduced travel. Trying to do the impossible simply discredits the government. Some conservation policies do make good economic sense when the price of energy is below its true value—for example, encouraging homeowners to insulate their homes by offering low-interest loans. However, the need for this kind of conservation would shrink dramatically if the domestic price of energy were raised to the appropriate level.

The second major threat of mistaken policy is that taxpayers will be asked to finance the difference between the high cost of producing energy in the United States and the low price that consumers are asked to pay. For years the government has subsidized nuclear-generated electrical power, yet even today the future of such uses of atomic energy is seriously under question. Recent policy is moving even further in the direction of subsidizing production: The Energy Research and Development Administration (ERDA) is financing domestic energy projects that are feasible only given a permanent guarantee from the taxpayers that the output can be sold for *considerably more* than the current world price. But it is an illusion to think that Americans are better off with higher taxes rather than higher energy prices. Individuals can choose to avoid high energy prices by limiting their consumption, but high taxes must be paid regardless.

The principal danger today is deep government involvement in exotic new forms of energy, notably gasified coal and oil extracted from shale. So far private industry has been unwilling to involve itself because these energy sources are too expensive, and are likely to remain so for some time in the future. Cost estimates are continually revised upwards every year. (Curiously, the cost of shale oil is invariably estimated to be around $6 above the world price of oil, no matter what the latter happens to be.) It is no wonder, then, that private firms are unwilling to commercialize these forms of energy—they are simply bad bets. But rather than subsidize costly new energy sources, it is preferable to purchase oil from OPEC at world market prices. Offering government guarantees or sub-

sidies to developers of new energy forms means requiring the nation to pay much more for energy than is necessary.

Those who support government participation in commercializing nonconventional energy forms claim that the risk of developing them is too great to be assumed by private industry. There is some risk, but almost none results from the small likelihood that OPEC will reduce the world oil price. Complete decontrol of oil and gas prices will eliminate the risk caused by present government policies. Most of the risk is just the normal uncertainty associated with any venture involving new and complex technology—which is not the reason that private industry is unwilling to undertake such projects. The problem is that they are just not commercially feasible and are not likely to become so even if OPEC were to continue increasing prices at the rate of 10 per cent or 15 per cent a year for the next 10 years.

What energy policy should do

1. *Eliminate price controls on oil and natural gas:* It is of primary importance to move quickly towards the deregulation of oil and natural-gas prices. Past and present controls have resulted in shortages, increased imports, and the future prospect of higher than necessary prices. In addition, they have resulted in the wasteful consumption of energy resources that have been artificially priced below their true value.

We have already explained how the present system of price controls on crude oil results in subsidizing a growing level of imports. If current controls continue, domestic oil production will diminish as demand continues to grow, and we will soon face an unacceptably high level of imports that will ultimately have to be subsidized directly from general tax revenues. It is therefore essential that crude-oil prices be decontrolled. This will result in greater discoveries and additional reserves of oil, as well as greater production from existing but currently uneconomic sources. By increasing supply and decreasing demand, higher oil prices are a more efficient way to reduce imports than a simple tax that affects only demand. Furthermore, deregulation would result in a lessening of the uncertainty over future prices that is now associated with uncertainty over government policy. The decontrol of crude-oil prices could be done slowly—perhaps over three or four years—in order to avoid a sudden inflationary macroeconomic shock, but it should begin soon.

The regulation of natural-gas markets has been an issue before

the Congress for some time, but unfortunately no action has resulted. Studies show that if wellhead prices of natural gas are fixed at their recent levels for the next two years, we will experience shortages averaging about 25 to 30 per cent of total demand by the end of that time. Furthermore, these shortages will not be spread out evenly across the country, but will be concentrated in particular areas; in some states there will be shortages that are more than 50 per cent of total demand. This means that curtailment of natural gas will spread beyond industrial users to residential and commercial consumers, so that households may have their gas for heating and cooking turned off. But even if they are limited to industrial consumers, curtailments will result in reduced output and increased unemployment, both directly and indirectly through the effects of supply bottlenecks. We have only begun to experience such shortages this past winter. Obviously they are extremely harmful, and must be avoided.

Shortages of natural gas could be partially dealt with by importing liquified natural gas (LNG). But just as tickets to a Broadway show are sold by scalpers at an unreasonably high price when the box-office price has been set too low, LNG represents an unreasonably costly alternative to domestic natural gas that could be purchased at lower prices under deregulation. In addition, the primary exporters of LNG, Algeria and Indonesia, are members of OPEC. It is interesting to note that recent contracts signed with these exporters call for a wholesale price (after regasification in the United States) of $4 to $5 per thousand cubic-feet—about double the average world market price for energy, and equivalent to oil at $24 to $30 per barrel. Consumers have been saved from higher prices through regulation, only to have to face still higher prices for LNG imports.

The effects of natural-gas shortages go beyond natural-gas markets, and result in increased demand for oil, coal, and electricity. Users who are unable to obtain natural gas do not conserve energy but instead switch to other fuels, which means greater imports.

Econometric research into natural-gas and oil markets indicates that a new contract wellhead price of about $1.70 to $1.80 per thousand cubic feet would be sufficient to clear natural-gas markets within two or three years, given current crude-oil prices; new contract prices of about $2.00 to $2.20 would be sufficient to clear markets, given higher oil prices resulting from the removal of oil price controls. By contrast, the new contract wellhead price has of late been set by the FPC at about 50 to 60 cents. The FPC has recently attempted

to raise the new price to $1.42, but so far has been blocked by the courts. This policy shift by the FPC represents a large step in the right direction, but is still not enough—since with decontrolled oil prices, natural gas would still be underpriced by about 25 per cent, which would result in the need for growing LNG imports.

The decontrol of natural-gas markets should proceed in the following manner, assuming the simultaneous decontrol of oil prices. New contract prices should be allowed to rise to $1.50 in the beginning of 1977, to $1.75 by the beginning of 1978, to $2.00 by the beginning of 1979, and should be free of all controls by the beginning of 1980. The practice of "rolling in" prices (i.e., averaging the higher new contract prices with the lower old contract prices, so that the consumer faces something in between) means that average wellhead prices would not reach the $2.00 level until 1983. On the other hand, the natural-gas supply will increase significantly over the next few years under decontrol.

2. *Protect the poor:* Policy-makers have been guided by a strong desire to keep consumer prices from rising. We must recognize that the decontrol of natural-gas and crude-oil prices will indeed result in higher fuel prices for consumers: Retail natural-gas prices will increase by about 40 to 50 per cent by 1982, and residential fuel-oil prices will increase by about 20 to 30 per cent, placing a significant burden on lower-income families. A new energy policy must therefore include measures to offset this burden. Expansion of the present food-stamp program to cover fuel expenditures is the most promising way of helping the poor. Food-stamp allotments should be increased, and home-heating bills (or that portion of a family's rent allocated to fuels) and gasoline purchases should be covered under the program.

The cost to the taxpayer would be modest. The expanded food-stamp program would be aimed at the lowest 20 per cent of the income distribution, a group that consumes about seven per cent of the energy used for heating, cooking, and transportation in this country—about .4 billion barrels of oil-equivalent per year. Since the complete decontrol of oil and natural gas would result in an average price increase of approximately $5 per barrel of oil-equivalent, the cost of the program would be about $2 billion per year, which represents only a 15-per-cent increase in the cost of our current food-stamp program. An improved program would be much less costly to the taxpayer than subsidizing the energy consumption of all consumers.

3. *Prepare now to counteract future oil embargoes:* Though an

improved energy policy would dramatically reduce oil imports, there would continue to be some imports, which probably will rise over the years as the growth in energy demand accompanying economic growth outstrips the growth in domestic energy supply. Dependence on imports raises a serious issue of national security. An anti-embargo policy is essential to prevent OPEC, especially its Arab members, from influencing the international policy of the United States. With effective measures established, the likelihood of an embargo is diminished, and should one occur its effect is minimized. In the absence of such policies, the threat of an embargo is almost as effective as an embargo itself.

The most important anti-embargo measures are standby programs that can be brought into action quickly after an embargo takes effect. A comprehensive policy should include the following:

a) Standby domestic sources of oil: The United States has already undertaken a small program for storing a crude-oil reserve; this program should be continued and enlarged. In addition, existing government-owned petroleum reserves should be brought into production quickly during future embargoes. Finally, state regulation of production should be loosened during an embargo, as it was during World War II.

b) Standby programs for limiting oil consumption: Tax incentives or other methods should be used to induce utilities to prepare to convert to coal in the event of an embargo. This may require stockpiling in some regions. Federal taxes on oil, especially gasoline, should be increased substantially during an embargo to limit lower-priority uses. Regulated sectors dependent on oil, including trucking, railroads, and airlines, should be permitted to raise their rates immediately to pass through these higher taxes to induce their customers to limit use of energy-intensive services.

c) Increased food/energy stamp allotments during an embargo: The adverse effect of increased prices should be offset for poor families by an increase in their share of food/energy stamps. Since poor families consume relatively little energy, during an embargo it is not necessary to ask them to make the same proportional reduction in energy use as families who are better off.

d) Expansionary monetary and fiscal policy: The economy should be kept on an even keel with a limited rate of inflation so that it will never find itself fighting inflation at the same time an embargo is imposed. Then the country will be in a position to tolerate the modest burst of inflation that will inevitably accompany an embargo. Further, the proper use of the food/energy stamp program will limit the damaging effect of inflation on the real incomes of the poor. Some extra stimulus from monetary and fiscal policy will be feasible to counteract the adverse effects of an embargo on unemployment and GNP. Both the embargo itself and the expansionary response to it are somewhat inflationary. However, the termination of an embargo and the cessation of anti-em-

bargo policies will have an anti-inflationary effect that will come close to offsetting the original inflation; thus an embargo should have no lasting effect on the price level.

These programs would sharply limit the damaging effects of future embargoes. We believe that a successful anti-embargo policy is compatible with fairly high levels of imports, even exceeding current levels. Unfortunately, many believe that national security can be achieved only with a substantial reduction in oil imports. But a permanent reduction of imports is an extremely expensive way to guard against a temporary embargo that may never come. A large reduction can be achieved only with a large increase in the domestic price level. Experience with the 1975 tariff on oil imports showed unequivocally that a tariff on oil increases not only the price of imported oil but also the price of domestically produced oil, by the same amount. Moreover, a tariff raises the prices of other energy as well. A deliberate policy of inflation to limit oil imports is simply counterproductive, especially when there are better ways of achieving the goal of security that are not at all inflationary, except in the unlikely event of an embargo.

Had the above steps been taken during the 1973-1974 embargo, the strain on the country would have been much less. Instead, government policy did nothing to increase domestic supplies during the embargo. Government reserves were not brought into production, nothing was ever done about state restrictions on production, and efforts to limit oil consumption were limited to the 55-mile-an-hour speed limit. As prices rose, little was done to help the poor, and the lack of assistance was a major obstacle to a constructive response to the embargo. In addition, the government did not meet the embargo with an expansionary monetary and fiscal policy—instead, a tax *increase* was proposed while the effects of the embargo were still being felt, and monetary policy during and just after the embargo was more contractionary than at any time in the previous 30 years.

The federal government relied almost entirely on a single tool to deal with the embargo—a gigantic new bureaucracy, the Federal Energy Administration (FEA), which tried to be responsible for the movement of every barrel of oil in the United States. Even though the FEA did nothing to increase supply, and very little to decrease demand, it thought that it could somehow "allocate" oil to users so that everything came out even. But allocation without balancing supply and demand was impossible, and the result was long lines for gasoline.

4. *Support energy research:* Though the government should keep out of the development and production phases of energy supply, government support of basic research on a reasonable scale is a good economic policy. Better knowledge of energy sources not currently in widespread use has an especially high social value beyond the incentives facing private researchers. Ideas and techniques developed in publicly supported research should be made freely available, and the private sector can be counted upon to commercialize new energy sources that make good economic sense, without any government subsidies.

Good candidates for research support include solar energy, which is the only source of power free of thermal pollution, as well as new technologies for energy conservation. On the other hand, coal gasification and shale oil, although nonconventional, are beginning to move beyond the research stage, and should only receive support aimed at the development of new technologies that might make them economic in the future.

In addition, there should be a shift in the current allocation of support. Currently, over 45 per cent of all energy research funds is directed towards nuclear power, while only five per cent is allocated to conservation. Given the potential environmental and security hazards of nuclear power, together with its questionable economic feasibility, reallocating some of these funds to other nonconventional energy sources would be preferable.

5. *Undermine the OPEC cartel:* Today's high world price for energy is directly the result of the monopoly power of OPEC. The difficult problems of energy policy would largely disappear if OPEC were to disintegrate and the price of oil were to fall to $3 or $4 per barrel. Even though OPEC is by all appearances in robust health today, the United States should do whatever possible to weaken the cartel and encourage its members to cut the price of oil. Economist M. A. Adelman of M.I.T. has proposed an ingenious scheme that deserves a trial. Under his plan, tickets would be sold in an anonymous auction to the highest bidders. Each ticket would give the holder the right to import one barrel of oil. The tickets would be freely transferable, and an active resale market would be encouraged. The system would encourage cheating by permitting OPEC countries to establish brokers who would bid for and purchase tickets in the United States.

Suppose that Libya would like to increase its production by selling a certain amount of oil to the United States at $2.00 below the posted OPEC price. Then a broker representing Libya would bid

for and purchase tickets (at a price of $2.00 per ticket) that would be transferred to an importing company in return for an agreement to buy oil from Libya. This kind of price undercutting would be hard to detect, since Libya would appear to be selling oil at the posted price, but in fact would be giving a rebate of $2.00 to the United States government in return for an assured sale.

It would be unwise to put too much hope in the success of this plan, despite its ingenuity. It may result in some price undercutting, but it is unlikely to weaken OPEC significantly, and policymakers should probably expect OPEC to set the world oil price for years to come. On the other hand, the plan could at least result in the collection of substantial revenues at the expense of OPEC, and it should therefore be implemented as soon as possible.

The outlook for the future

If our present policies are continued, and if our GNP grows in real terms by about four per cent per year, the total demand for energy in this country will reach about 44 million barrels of oil-equivalents per day by 1980. Domestic production, however, will remain roughly constant at 32 million barrels per day. This will mean a growth in oil imports to around 12 or 13 million barrels per day (about 30 per cent of our total energy consumption, and 70 per cent of our oil consumption), or else increased subsidization of high-priced nonconventional energy sources and increased imports of high-priced LNG to help close the growing gap between consumption and production. Although the average price of all domestically produced energy could be held below $8.00 per barrel of oil-equivalent, the true cost of energy to consumers would begin to rise rapidly as greater tax revenues are used to support the import program and to subsidize nonconventional sources, as taxes are imposed on energy consumption, and as the cost of LNG imports is averaged in with the cost of domestic energy and oil imports.

On the other hand, if the policies outlined above are adopted, the total demand for energy would rise to only 40 million barrels per day in 1980, and supply would increase to 34 or 35 million barrels per day. This would mean a reduction in oil imports to about five or six million barrels per day, a level that would impose no strain on the country's economic and political security. The price of energy would rise to an average of about $12.50 per barrel, but the poor would be buffered from this price increase, and consumers in general would have the option of avoiding some of the extra

expense by using less energy—as opposed to being forced to subsidize the lower price through taxes.

Adoption of these policies would be a startling turnabout. For the next few years, at least, policy-makers will probably choose to limp along under the present regimen of cheap energy for consumers through subsidizing a growing volume of imports from OPEC. Very soon, however, the limitations of this policy will become painfully apparent. In only a matter of a few years, continuing the present level of subsidy will be feasible only if funds from the federal budget are available to augment the diminishing yield of the present heavy tax on domestic oil production. Then we will enter an era characterized by a growing flow of funds directly from American taxpayers to OPEC—or preferably, a growing acceptance of the need for a higher energy price. But it would be much better to anticipate this problem by moving today toward higher energy prices. Delay will only make the eventual accommodation to the high world energy price all the more difficult.