FUTURE ENERGY DEMAND

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My observations today will cover three discrete points: 1) aggregate demand for energy in the U.S. from the present until the year 2000; 2) supply limitations on a critical resource - natural gas, and 3) implications of the new Energy Policy and Conservation Act on activities of the GAO. The last item is not as directly related to the subject assigned to this panel as are the other two. However, I was asked to mention it because of possible implications it could have on activities affecting your work.

First, I would like to spend some time today discussing aggregate future energy demand in America. Much of what I am discussing here is drawn from the work we did at the Ford Foundation's Energy Policy Project. If you find you are interested in more detail than I can describe now, I urge you to get a copy of the Project's final report--A Time to Choose.

The obvious question facing us regarding the future is, "What is the Nation going to do about the gap between domestic production and domestic consumption?" We can increase supply, reduce demand or do some combination of both.

However, in the short term, our options are very limited, since the lead times to do almost anything significant about energy policy are generally longer than 2 or 3 years. In essence, it is not likely that, by

our actions we will significantly change the basic patterns of demand in the next two or three years. However, we can begin to improve the efficiency of existing systems, and most importantly, we can begin to make decisions that will shape growth patterns over the middle and long run. There is a major caution here. While doing these things, we should be very careful not to make adverse long-term decisions in the midst of a short-term panic. In the short term it is especially crucial to keep our options open.

In the mid term, we can make significant improvements in the energy efficiency of our technologies and help encourage consumer changes which can slow the growth in demand for energy.

In the long term, after 1985, the Nation has a considerable number of options. We need not be in an energy straight jacket. As Lewis Mumford has said, "Trend is not destiny." However, trend can be a self-fulfilling prophesy if we let it become so.

The Energy Policy Project did not project, predict, or prophesy. Instead, three energy scenarios were developed. These alternative energy futures run through the year 2000. These scenarios were called Historical Growth, Technical Fix, and Zero Energy Growth, or ZEG.

All three scenarios are feasible--they could happen. However, the real energy future will likely be a composite of each. If I had to guess about the long-term demand curve which we might actually achieve over the rest of this century, I would choose something near what the Technical Fix scenario depicts.

The essential difference between the three scenarios is the energy demand growth rate. All too often we have been told that energy demand is automatically dictated to us. EPP rejected this postulate. The Project

concluded that over the long run energy demand growth rates can be substantially reduced without adverse effect on the national economic health and well being. Indeed, we concluded that reduced growth rates in demand for energy would be necessary to sustain national well being.

With the Historical Growth scenario, total energy consumption is assumed to grow at 3.4 percent per year. "Historical Growth" is now somewhat of a misnomer since U.S. energy consumption is no longer growing at 3.4 percent, but in fact has remained relatively stable for the past two years since the embargo. The reasons for the change stem from a combination of higher energy prices and the overall economic recession. As the economy recovers and energy consumption starts to rise again, we will probably find our rate of growth somewhat lower than "Historical Growth". Nonetheless, an analysis of the Historical Growth scenario can still be useful as a yardstick against which to measure lower growth options.

Annual U.S. energy consumption under Historical Growth would be in 2000 about 2.5 times what it is today. Such an energy future would require the aggressive development of all the major energy sources, domestic and foreign.

EPP concluded that there are very serious problems associated with this scenario. In the first place, it will be difficult, if not impossible, to improve environmental quality so as to protect the health and welfare of citizens. In fact, to hold pollution to today's levels would require substantial improvements in control technology.

Further, by pushing very hard on all our major energy sources, we would not have the option of slowing the growth of any supply source until we can better understand the environmental and health implications. Energy growth at this rate would require tremendous investments of capital.

Whether the society could maintain such huge capital expenditures for energy systems while meeting other economic needs is open to question.

As I have already mentioned, the EPP's second scenario is called "Technical Fix". If I were doing it over I'd leave out the word "Fix" and substitute "Efficiency". "Fix" sounds like a gimmick, which the scenario is not. In this energy future, total United States energy would grow at about 1.8 percent. This means that in the year 2000, total annual U.S. energy consumption would be about 1.6 times what it is today, an energy savings equivalent to over 32 million barrels of oil per day when compared to Historical Growth.

Such a savings would be achieved by applying existing, economic technologies to our patterns of energy use. Its thrust would be to squeeze the fat out of our wasteful use of energy. No major lifestyle changes would be required to do this. We would just do things more efficiently from an energy standpoint. Homes would be better insulated; cars would be somewhat smaller and more efficient; recycling of metals and other materials would be emphasized. The Nation's GNP would be very similar to the Historical Growth scenario. In fact, EPP research found that GNP and energy consumption need not be directly proportional to each other.

The Zero Energy Growth scenario would involve a few, but only a few, fairly substantial changes in how we live. In ZEG, the total energy consumption of the Nation would stabilize at about 1.3 times present consumption rates or possibly less.

ZEG would parallel Technical Fix until the mid-1980s. This is because of lead time problems. It takes about 10 years to begin to

substantially replace a major portion of existing energy consuming technology. ZEG then would apply a "Super" technical fix; particularly in the automobile sector, so that average fuel economy reaches 25 mpg or more by 1985 and 33 mpg or more in 2000. In addition, the Nation would emphasize such options as:

--Mass transit

--New communities having integrated utility systems (energy complexes)

--Industrial parks (energy complexes)

--Encourage movement towards a service economy.

ZEG would not mean that we would "go back to the caves." In fact, assuming U.S. population continues to stabilize, ZEG would provide for 10 percent more energy per capita than we use now.

ZEG would not hold down the poor. In fact, there would be enough energy to raise the energy standards of the poor to the level of middle income Americans. The economy could still grow--zero energy growth does not mean zero economic growth. Instead of saying "more is better" the Nation would stress a different theme: "enough is best". Such a change in values would require us to reassess what we think is important in our lives.

Why should the Nation move toward Technical Fix or ZEG? There are many reasons. The more we must go all out to supply a rapidly increasing demand for energy, the less flexibility the Nation has. The Technical Fix scenario provides both more time and more flexibility, so that a mistake does not overload the whole system.

The so called Technical Fixes would be in a few key areas; such as space heating, improved energy efficiency, improved auto fuel economy, and use of solar energy where economic.

On the supply side, implementation of the Technical Fix scenario would permit us much greater flexibility. For example, it would be possible to both reduce or eliminate imports and drop or slow down commitments to one major new energy source, e.g., nuclear power, Western coal, or OCS. Even so, the Nation would have to increase one domestic source significantly or continue to rely on imports.

What about ZEG (Zero Energy Growth)? Why should the Nation consider moving toward ZEG? There are several reasons:

1. The capacity of the earth is finite;
2. Other nations and our descendants will need the resources;
3. High technology, highly centralized societies may have serious problems in a resource short world; and
4. Citizens may want a different kind of America.

What are the cost implications of the different scenarios? In one of its more revealing exercises, the Energy Policy Project found that the total capital cost of the Technical Fix scenario would be about $1,450 billion as compared to $1,750 billion for the Historical Growth scenario. Thus, not only would a Technical Fix conserve energy, it would conserve capital. This would, of course, help to forestall the capital crunch which many analysts believe will result from extensive energy development in the years ahead.

IMPLICATIONS OF DEREGULATING THE PRICE OF NATURAL GAS .

After spending the last several years studying energy demand, I have more recently devoted time to questions of supply. I am concerned that the country hasn't focused enough on "whether we can get there from here". Accordingly, at GAO we are involved in a number of studies that attempt to

address this question. Last summer, we completed an analysis of the "Liquid Metal Fast Breeder Reactor: Promises and Uncertanties" and last month we completed an analysis of "Implications of Deregulating the Price of Natural Gas". We are now begining a third study in the series on the future of coal in the U.S. energy supply picture.

Let me report to you briefly on the results of the natural gas study. The study, conducted at the request of Congress, addressed the energy supply, economic, social, and environmental implications of natural gas deregulation. While my previous remarks indicate that we can choose the energy demand future we want, our analysis of the U.S. domestic natural gas situation, at least through 1985, reveals that our supply options for this fuel are limited. To the extent, supply limits could choose our natural gas demand for us.

A key question is: "How much more natural gas can we expect with or without deregulation?"

First of all, our analysis indicated that the supply of natural gas is constrained by factors other than price. Thus the answer to the question of domestic natural gas supply depends upon interrelated assumptions regarding such factors as the price response to deregulation, the additional exploration generated by higher prices, the amount of undiscovered resources, and the rates at which new supplies are found. Each of these is the subject of great debate. Despite the differing judgments on these factors, however, there is a reasonable consensus in both Government and industry regarding reserve additions required to achieve a particular level of production. Using this consensus, GAO developed three supply cases.

--Our low supply case assumed continued regulation with pricing patterns similar to that occuring in recent years.

--The medium case assumed deregulation and new gas finds equal to the best 10-year period experienced since 1945.

--The high case assumed deregulation and sustained new gas discoveries larger than ever previously experienced.

We concluded that, while the high case places an upper limit on likely gas supplies under deregulation, it is probably unrealistic.

We believe that our medium case is optimistic, but attainable. It results in increased natural gas supplies in 1985 of 1.5 tcf (about 9 percent) over projected supply under the low case which assumes continued regulation.

However, when compared to natural gas supplies in 1975, the medium case results in a 13 percent decline in supply by 1985 as compared to a 20 percent decline under the low case (continued regulation).

Economic and Social Effects

Using the Wharton economic simulation model, we compared continued regulation with deregulation if the average deregulation price reached $2.10 (city-gate) in 1980 or 1985. In all cases, Gross National Product, the rate of inflation, and the rate of unemployment are virtually the same indicating that gradual deregulation would not be likely to have major consequences for the Nation's economy.

Consumer Effects

We estimated that under deregulation additional costs to consumers of natural gas would peak at $13 billion in 1980, decreasing to $4 billion in 1985. The cumulative additional costs of deregulation under GAO assumptions for the 10 years ending in 1985 are estimated at $75 billion,

an increase of 22 percent over the costs with continued regulation. The marginal cost of the increased natural gas produced, however, is quite high, amounting to about $9.62 per MCF.

Under our assumptions, costs to consumers under continued regulation would continue to increase because of price rises within the regulatory framework and because consumers who could no longer buy natural gas would purchase substitute fuels at higher prices.

Industry and Residential Effects

In the aggregate additional industrial fuel costs resulting from deregulation of natural gas or the use of alternative fuels should not be significant, since total expenditures by industry for natural gas in 1974 represented less than 1 percent of the monetary value of industrial output.

Some industries, however, could be severely impacted. They include:

--industries for which natural gas costs represent a significant portion of their selling price (such as the cement industry)

--industries which depend upon natural gas for its unique material or quality heating value rather than for its energy value and for which there is no practical substitute (such as the fertilizer, plastics, certain textile and baking industries).

Because FPC regulations give priority to residential customers in times of shortages, most interstate residential customers would continue to receive supplies under continued regulation. Therefore, the primary impact of deregulation on those residential consumers would be in increased prices. However, prices also would continue to increase under regulation, but more slowly.

Conclusions regarding supply

Even with deregulation, natural gas production is likely to continue its decline. Deregulation could, however, slow, and possibly arrest the rate of decline. Without it, production would decline even more steeply. It is unlikely that the Nation will ever again achieve production in the amounts currently being experienced.

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THE ENERGY POLICY AND CONSERVATION ACT

I have been asked to describe briefly GAO's new responsibilities under the recently enacted Energy Policy and Conservation Act. Last December, when the President signed the bill into law, most of the public discussion of the Act's impact was over such issues as the effect of the automotive fuel economy standards, or how many cents the price of gasoline would drop given the roll back on crude prices. We at GAO, however, were poring over Title V of the Act - the general provisions or catchall section. Title V confers upon GAO a significant new responsibility in the energy data verification area and carries with it important implications for the information disclosure practices of the Nation's energy companies.

Section 501 states that GAO may use its authority to inspect the books and records of energy companies, including issuing subpoenas and requiring responses to interrogatories. Our traditional role has been to evaluate and report to the Congress on how effectively Federal agencies are administering their programs. For example, in the case of FEA's recent study of U.S. oil and gas reserves, we could examine FEA's procedures and methodology for conducting the study and conclude that they did a good or bad job. We did not have the authority, however, to go to the oil producer's records and determine if the producer over or under-reported his reserves to FEA. Now we have that authority.

Specifically, GAO can inspect the books and records of private persons and companies under the following conditions:

1. A company is legally required to submit energy information to FEA, FPC, or Interior;
2. A company is engaged in the energy business (other than at the retail level) and
   a. furnishes energy information directly or indirectly to any Federal agency (excluding IRS), and
   b. GAO determines that the Federal agency uses this information carrying out its official functions.
3. The energy information is any financial information pertaining to a vertically integrated petroleum company.

Although GAO has the authority to carry out these verification examinations on its own initiative, we are required to conduct such verification examinations if requested to do so by a congressional committee having jurisdiction over energy matters or any laws administered by FEA, FPC, or Interior.

We are anticipating that our new authority will generate a substantial number of requests from congressional committees since we have identified roughly 33 committees and 86 subcommittees having some jurisdiction over energy matters.

We expect GAO to be called up to provide "answers" to the many questions marks punctuating current congressional energy debates. With this new authority and a continuation of our ongoing efforts, we in GAO are hopeful that we can provide information to the Congress and the executive branch which will assist them in choosing the best options available for the Nation's energy future.