

CLOUDY DAYS ON THE ENERGY SCENE

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For the past century, the picture of this country in terms of the supply and costs of its energy has been one of bright sunny days. Now and then a few clouds have appeared over certain areas--there was, for example, the great oil shortage scare just after World War I, when it was thought that this country's oil resources were being exhausted. By and large, however, there was unrelieved sunshine. Within the past year, in contrast, we have seen for the first time the gathering of ominous storm clouds all around the horizon. It is possible that the storm can sweep down upon us from any direction, or even from all directions at once. During this year there have already been certain isolated thunderstorms, so to speak. There are some who say we shall never see the sun again, at least for the next decade or so, and that the storms will be upon us within the next year or so.

It's time to give that metaphor a rest, but at least it sets the mood. What I'm talking about, of course, is the Great Energy Supply Crisis of 1970. The truly extraordinary thing about the crisis is not so much that it has occurred, but that it developed with such extreme rapidity and, in so doing, was unforeseen and unforeseeable.

Now to say this to a group of oil men may verge on the foolhardy, but I think at least I have gotten your attention. How can I say that it was unforeseen and unforeseeable when the petroleum industry has been crying the alarm for years about inadequate incentives and the decline in the reserve position? How can I say it was a rapid development when exploration activity has been tumbling for many years?

It is true that the petroleum industry has been saying that prices, hence incentives, were insufficient. But if you will go back and look at the trade journals and general press you will find that the industry has been saying this virtually uninterruptedly ever since World War II. If higher oil and gas prices were not being called for immediately, there was always the contention that they would have to be higher in the future. No, one cannot say that chronic cries of alarm, in good times as well as bad, constitute a true warning of things to come.

As for the speed of the development, although there has been a more or less general decline in

drilling activities since the 1957 peak, and although gas production has exceeded reserve additions for the past two years, this has not affected current deliverability levels. Nor has the productive capacity of domestic oil wells been a contributing factor to any oil shortage; all that has happened is a decline in excess capacity. The suddenness I have in mind is illustrated by the fact that as recently as March of this year it was possible to say that there was no real pressure on the supply of residual fuel oil, in the sense that anyone could have all he wanted at a price. Three months later, however, the situation was totally different. There were cries up and down the Atlantic seaboard from those who found themselves unable to get resid commitments at any price, and there were others (to my personal knowledge) who considered switching to the use of resid, quietly investigated the market, and gave up.

No, the fundamental reason for the energy crisis of this year was not price, but the move for environmental preservation--specifically, air pollution abatement. Let me explain. When the utilities in the New York City areas were first ordered to reduce the sulfur content of the fuels they burned in their boilers to two percent or less, they had no idea where a supply of such fuel existed, or whether they could get enough of it to meet their need. Neither did the fuels industries, and I am sure the air pollution control authorities had no idea either. But to everyone's surprise, the utilities were able to satisfy all their needs and still beat the deadline. Supplies of low-sulfur resid turned up out of nowhere.

Given the national mood on air pollution and the legislation that was being passed at all governmental levels, it was obvious that such sulfur restrictions would come to be applied in most large urban areas; but I think this New York experience may have contributed to the speed with which this development occurred, authorities in other localities being confident that the necessary supply of fuel meeting the new sulfur standards would turn up. It was one thing, however, for New York, a single metropolitan area, to accomplish this; it was another when many metropolitan areas attempted the same thing at

the same time. Chicago, for example, overnight became an important potential resid market when the local large fuel users found themselves unable to get sufficient low-sulfur coal to satisfy the new pollution abatement regulations.

Moreover, it is now apparent that the unusually large growth in the number of new gas customers and the appearance of unsatisfied potential gas customers during the past year or so has been due, at least in part, to the fact that commercial and industrial fuel users, seeing what was in the wind, began converting or trying to convert to gas--the fuel that would remove them from all worries about sulfur restrictions, no matter how severe. Everyone knew that there was simply not enough low-sulfur coal to satisfy the prospective need, so they turned either to gas or to low-sulfur resid as the answer.

Now my point is that no matter what the price of oil and gas might have been over the past year or so, the industry simply could not have met the enormous new demand that was flooding onto the markets. Don't forget, nobody has yet gone cold for lack of fuel this year. The main problem is the matter of meeting this new demand growth.

It would be wrong, however, to say that the entire problem has arisen because of air pollution abatement. The crisis would not have been so severe were it not for purely fortuitous events that occurred in the different fuels. I am sure you are familiar with them. In coal there were labor troubles, a shortage of hopper cars for transportation, the boom in the export market and the diversion of coal to that market. In oil there was the Tapline interruption and the squeeze put on the oil companies by the Libyan Government, leading to skyrocketing spot tanker rates, plus the rapid increase in the demand for low-sulfur resid throughout the world. In the electric utility industry it was a combination of troubles on all the environmental fronts, plus delays in completing nuclear plants, plus troubles with a number of very large units that were being put on the line more or less at the same time.

So here we are with the clouds all around us. What's the weather forecast? For the short term--that is, this winter--the outlook is for possible showers. It is the position of the Administration that things are working themselves out and that, barring some really nasty winter weather, we should get through without serious trouble. The labor troubles at the coal mines have simmered down, the ICC has helped pry hopper cars loose, the Japanese have been persuaded not to be quite so aggressive in bidding for coal and domestic refiners are going to turn out resid.

This is the picture Chairman MacCracken of the President's Council of Economic Advisers described to the IPAA early last month. I hope he's right, but it's interesting he didn't have much to say about No. 2 oil. With respect to resid, however, he made a curious argument. "How did we get to rely so heavily on foreign resid?" he asked. His answer was that the opening up of the East coast to foreign resid contributed to a decline in domestic resid production. This is just plain wrong. As I am sure you know, resid has long been an uneconomic product domestically, and the technological trend away from resid output is also of long standing. The import controls for resid were relaxed because East Coast users found their domestic supply constantly declining, so that without recourse to foreign supply they were faced with an absolute scarcity.

So much for the short term. We won't have long to wait for the answer. What about the weather forecast for the long term? I think there is general agreement that the clouds will remain indefinitely. In the first place, the pressures for further pollution abatement and for general environmental preservation will increase in the future. Sulfur limitations are scheduled to go lower almost everywhere there are pollution controls. For example, on October 1, 1973 the permissible maximum sulfur content of fuel oils for burning in Philadelphia will be 0.3 percent for No. 4, No. 5 and No. 6 oils; 0.2 percent for No. 2 oil. This means that price pressures will remain, and the availability of low-cost energy for stationary purposes will be a thing of the past, although I would not expect this to continue indefinitely. The breeder reactor, fusion power, or some as yet unforeseen technology should eventually bring about lower energy costs.

Now let's look at the outlook for the specific fuels. For coal the outlook depends on two things. One is the speed with which new mines can be opened up to supply coal to users who do not have to worry about sulfur content. As the coal industry delights in reminding us, there is no possible long-run supply problem, since our reserves are sufficient for centuries. With a new high level of coal prices, supply should respond although there may be some difficulties in reversing the long-term downtrend in the mine labor force. The second determinant, for those who must use low-sulfur fuels, is the perfection of stack-gas desulfurization. As you probably know, the National Research Council has reported that there is no feasible, economic means of stack-gas desulfurization presently available. Several processes are being worked on, and it should be only a matter of time until one or more

is demonstrated to be commercially reliable. This should take several years, however, and before stack-gas desulfurization can become effective, it will also be necessary to perfect reliable monitoring devices for the stacks, which also do not exist at present. Still further, it will be necessary to demonstrate that such monitoring devices can be feasibly worked into a control program. I would say that it is likely to be towards the end of the decade before all of this could come to pass.

The outlook for oil depends on three things; the first is the availability of foreign low-sulfur crude or low-sulfur resid, including in this "foreign" supply the oil from Alaska. The second is the growth in desulfurization capacity in the United States and the Caribbean. The third is the output of low-sulfur resid from domestic refineries. Between these three developments, I would expect that it would be only a matter of a couple of years before the more severe aspects of the present supply situation will have been alleviated. It is significant in this regard that the solution to the supply problem does not really involve to any great extent the availability of domestic crude from the lower 48 states--that is to say, the size of our remaining oil resources.

I would assume that the supply of No. 2 oil would respond to the new, higher price levels, but New England's experience gives me pause. How is it that the area of the country with the highest prices has complained chronically, under the import control program, about insufficient supply? It can't be the competition from other fuels, for all fuels are high priced in that region. I confess the price behavior of No. 2 oil has always been a mystery to me, and I know of no one outside the industry who claims to really understand it.

Turning to natural gas, it is, as I have noted, the perfect anti-pollution fuel, thus it is already apparent that no matter what the resource position in gas and no matter how fast new reserves are found and developed, it is unlikely that gas supply can satisfy the potential anti-pollution demand. I did a little exercise a few years ago in which I took just the four or five major metropolitan centers of the country and assumed that their entire fuel use was converted to gas. I found that it would require something on the order of 6 trillion cubic feet of annual consumption for those centers alone. With projections of gas demand through normal growth already in the 30-to 40-trillion range for the coming decade or so, it is clear that the total potential demand, including all gas use for anti-pollution purposes, could easily double those

levels.

If this sounds unrealistic, I call your attention to the fact that there are now over one hundred Air Quality Control Regions either officially established or in the process of establishment under the Clean Air Act. Every one of these regions will have air pollution regulations, and it is reasonable to assume that many, if not most or all, will have sulfur restrictions as severe as those now effective or scheduled to become effective in the larger cities. If the demand for gas this is going to create were to be satisfied, we would have almost the equivalent of an all-gas economy for stationary fuel use. But that demand is going to remain unsatisfied, because even by drawing on every possible source, including Canadian imports, foreign LNG and any others you might think of, there simply wouldn't be enough gas.

This antipollution demand is artificial, in the sense that it does not stem from normal economic growth or market forces but has arisen because of government policy. If there is going to be unsatisfied demand, then it follows that there will have to be some kind of rationing. One way is to allow the price mechanism to perform this function, as it does in any free market. At any price, those who are unwilling to pay that price are frozen out of the market and the commodity is, in effect, rationed to those who can and will pay the price. But since the present situation was artificially created through pollution abatement, actions to allow free market rationing through the price mechanism would mean that the government would be handing the gas producers a windfall of enormous proportions which would have no corresponding beneficial economic effect. That is, since no matter how great the incentive provided by the price, the industry could not find and produce enough gas to meet the potential demand.

Whatever the justification for FPC price regulation under normal conditions (and I for one believe that that justification is strong), under the new circumstances it is absolutely imperative on the grounds of both economics and equity that such regulation continue. The result will be, of course, that the FPC will end up as the arbiter of gas rationing. But this is eminently logical--some arbiter is needed and the FPC, with its prior experience, is preferable to the air pollution authorities. Nevertheless, there will have to be very close coordination between the FPC and the air pollution people to insure that the equity of the individual consumer is not injured and at the same time that gas makes the maximum feasible contribution to air-pollution abatement.

In any event, the result can only be an increased

cost of energy to the consumer. Every instance of a switch to gas by industrial consumers (including the electric utilities) for any pollution purposes is an instance of increased cost to the consumer, since if gas were at present the cheapest fuel they would have already been using it. Thus the increased cost of energy is one of the costs of pollution abatement.

One of the results of our present energy difficulty has been a renewed push by the energy industries for a National Energy Policy. The trouble is, however, that each of the energy industries views that policy as one that would favor it: the coal industry thinks of its product as the most important because it represents the largest energy resource on which we can draw; the oil and gas industries view themselves as the most important because of the strong national security element. The fact is, any National Energy Policy, if it were adopted, would have to be a compromise and would therefore leave each of the energy industries unsatisfied. But, the important thing is to have not a National Energy Policy but a National Energy and Pollution Abatement Policy. It is the coordination of the measures to preserve the environment with our energy policy that is overriding in importance.

We have entered an era of high-fuel and energy costs because, as I have said, we have adopted a policy of pollution abatement. In economic terms these higher costs are justified in the sense that they constitute costs which were previously ignored. That is, we previously burned high-sulfur fuels and polluted the atmosphere because, for the fuel consumer, this was the least costly avenue. The cost of the pollution was being borne by society in general and no one in particular, thus there was no economic incentive for any individual fuel-burning polluter to change. Now, because of pollution abatement regulations, the change is mandatory, and the cost of pollution--which, in one measure, is the cost of abating it--is appearing in the higher price of low-sulfur fuels.

The producing industry looks with favor on such a high-price situation, but with \$4.00 residual oil and 25¢ to 30¢ gas, I suggest that a National Energy and Pollution Abatement Policy may lead in unexpected directions not favorable to the petroleum industry. Take, for example, the reaction of the Administration to the November rise in the price of crude and gasoline. To many in the petroleum industry I suspect it seems a bit unfair that a Republican administration would announce an investigation of a price rise the industry views as long overdue, and espe-

cially unfair when nothing is said about a General Motors' wage settlement that is certain to lead to increased automobile prices.

Without getting involved in whether the General Motors' settlement is or is not inflationary, the point is that there is a valid distinction between the position of the auto industry and that of the petroleum industry. The wage settlement is the product of a process in which the government had no hand. The petroleum industry, in contrast, can charge the prices it does only because of the protection it receives from the government in the form of the import quota system. The government thus has a legitimate interest in changes in oil and oil product prices.

Moreover, it has an even greater interest when it adds a strong kicker to certain petroleum product prices through the air pollution abatement program. The situation with respect to oil, in other words, is like that in gas, which I mentioned earlier. The industry cannot expect to enjoy a free ride from the pollution abatement program--legitimate increased costs in making low-sulfur fuels available will be allowed, but no additional profit kicker will be.

Still further, at the new higher prices for oil and gas it behooves the government policy makers to take a fresh look at the synthetic fuel that can be produced from oil shale and coal. There are some especially attractive features of the synthetic fuels under the new circumstances. For one thing, they dispose of the national security problem; we could be self-sufficient if we wished. Second, there is no problem of depending on discovery, with all the uncertainty that presents the policy maker. The known potential is sufficient to satisfy all fuel demands for an indefinite period, certainly for as far in the future as it is feasible to make any policy at this time. Third, and not the least of the advantages, they offer a complete solution to the sulfur aspect of the pollution problem: synthetic fuels from coal and oil shale are desulfurized in the process of production.

I think it becomes increasingly likely, therefore, that government policy in the future will look with favor on the development of a synthetic fuels industry. I would not be surprised if this went so far as active encouragement through tax incentives and direct subsidy; but at the price levels that are likely to prevail, it may be that the synthetic fuels industry will not really need much help. I recognize that there are pollution problems associated with their production -- such as the disposal of the spent shale and the waste culm banks from a coal mine. But the really

attractive oil shale prospect is exploitation through underground nuclear explosives or underground combustion which would make possible the production of shale oil by means of wells, and the coal waste, if necessary, can be put back in the mine.

For the petroleum industry the supplanting of crude oil and natural gas by the synthetic fuels would be mixed blessing. As you know, the majors and some of the independents already hedged against this prospect by taking positions of one sort or another in coal and oil shale. Some have coal company subsidiaries, others hold coal lands, as they do oil shale lands. They would merely shift operations from traditional drilling activities to the operation of mines and conversion plants. It would no longer be the oil industry as we know it, however, but would be a mining and processing industry. The days of the bonanza would be gone--there would be no billion-barrel oil fields; instead there would be billions of dollars of investment in plants for which doubling the output meant doubling or almost doubling the investment. The exploration risk would also be gone, hence the industry would be very much on the defensive in retaining the special tax provisions designed to offset that risk. The small operator would see hard days, indeed, and wildcatting on any significant scale would probably disappear.

In conclusion I would say that although the clouds at present are thick and although the prospects for seeing a wholly clear day again on the energy scene are very small for an indefinite period, perhaps even in our lifetime, I nevertheless believe that within at most two

or three years they will thin out considerably as the present crisis is past. Some of the pressure will certainly be removed by the further development of nuclear energy. Its overall advantages on the score of air pollution are so great that the present intense opposition to the siting of nuclear power plants anywhere will have to give way. As nuclear power comes to constitute a significant portion of total generating capacity, the rate of growth in fossil-fuel needs for power plants will first taper off and then diminish absolutely.

Even before that, however, with the new, higher prices, new gas reserves will come to market as the industry develops the finds it knows about but has been sitting on while waiting for the higher prices. Two to three years should also see adjustment to the fuel oil crises, as new sources of supply are developed and residual desulfurization capacity is brought more into balance.

Just when the sun's rays will first break through the cloud cover will depend on which of the longer term alternatives takes the pressure off gas and low-sulfur oil. It may be synthetic fuels; it may be stack-gas desulfurization; it may be the breeder reactor or, in the very long term, fusion power. It has been said that in the perspective of man's history, the present, heavy reliance on the petroleum hydrocarbons is but a passing phase. Our children and their descendants in the Twenty-First Century will look back at this period just as we look back on the economic troubles of the Great Depression.

"It was a close call for a time, but they made it, with a bit of luck."