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Delays in Tapping Energy Sources

The public continues to enjoy adequate supplies of energy, but severe shortages lie ahead. Consumption of energy goes on unabated in spite of a recession, higher prices, and presidential appeals. But domestic reserves of hydrocarbons are being depleted rapidly and the stage is being set for empty gasoline pumps, cold homes, and large-scale unemployment unless there is a drastic change in attitudes soon. A major factor is the long time span involved in creating new sources of energy.

This country's experience with nuclear energy is an example of the time necessary to develop a major new source. The first reactor went critical in December 1942. In 1973, nuclear energy accounted for only 1 percent of the nation's energy consumption. Ten years from now, nuclear energy will meet at most 7 percent of the nation's needs. Moreover, the energy will be made available as electricity and not in forms that will be in short supply. Prospects for quick, large-scale utilization of geothermal energy, fusion, and solar energy are even dimmer than those for nuclear energy.

Thus, for at least the next decade, energy horizons will be limited by oil, natural gas, and coal. But available domestic supplies of oil and gas are diminishing, at the rate of 4 to 6 percent per year for oil and about 7 to 8 percent per year for natural gas,* and barriers have been erected to obtaining more oil or gas and to the use of coal.

Perhaps the most serious and certainly the least recognized problems lie in the supplies of natural gas. It heats 55 percent of the nation's homes, is widely used as a feedstock for petrochemicals, including fertilizer, and is by far the largest source of energy for industry. The energy content of the natural gas used daily by industry is equivalent to that of about 5 million barrels of oil. National policy accords priority to residential demand for natural gas, taking it away from industry. Already, shortages have caused layoffs. During the period August 1974 to August 1975, industry will use 400 million additional barrels of oil because of gas curtailments.† The rate of decay of supplies is such that by 1980, with a few exceptions, industry will be prevented from using natural gas. This would have enormous effects on the economy.

In large measure, although not entirely, future natural gas supplies will be tied to those of petroleum. There are good reasons to believe that onshore and undiscovered gas reserves of the 48 contiguous states are comparatively small.‡ New supplies could come from the outer continental shelves and from Alaska. At best, 4 to 6 years will elapse before these can be made available. However, at the present pace of resolving environmental disputes, supplies will be much longer in arriving.

An important aspect of the decaying position is that the kind of conservation that was achieved in 1973 and 1974 would make only a small dent in the problem. Then the public cut its use of natural gas by 6 to 8 percent, that is, 3 to 4 percent of total consumption. If the public spent many billions of dollars on storm windows and added insulation, 1 year's decay in the supplies of natural gas might be compensated for.

Conservation is not enough. To make good the energy deficit due to decay of natural gas alone, a doubling of coal production during the next 6 years would be required. But to open a new underground mine requires about 5 years. The quickest path toward relief is expansion of surface mining of low-sulfur coal in the Rocky Mountain States. But with various delays connected with changeovers from gas or oil to coal and with environmental controversies, heaven only knows when this country will emerge from the years of travail and discontent that it is now entering.—PHILIP H. ABELSON

* *Oil and Gas Journal*, 4 November 1974. † *Oil and Gas Journal*, 25 November 1974. ‡ R. Gillette, *Science* **185**, 127 (1974).