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SYMPOSIUM: COAL UTILIZATION BY ELECTRIC UTILITIES—THE COSTS OF CONVERSION

INTRODUCTION

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Most of us are familiar with the story of Rip Van Winkle. You will recall that Rip drank an enchanted brew and fell asleep for twenty years. When he awoke, his world had been virtually turned upside-down. The United States of America had replaced the thirteen original British colonies from New England to Georgia; George Washington had displaced George III as the sovereign head of a new nation; and republican patriotism had superseded Tory loyalty as the virtue of the land.

Energy-wise and economically, an American who fell asleep in the 1960's and woke today might well feel like a twentieth-century Rip Van Winkle. In the '60's, energy was cheap; personal private passenger transportation was considered normative for the whole country, and the ideal of an automobile for every eligible member of the family did not seem far-fetched; proliferating air-conditioning was turning stores and homes into veritable iceboxes all across America during the hot summer months, and endlessly-running furnaces were producing an "oven-effect" in the cold winter months; the coal industry was viewed as terminally ill by some en-

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ergy authorities; and petroleum and natural gas held out the promise of an inexpensive, almost pollution-free future for mankind; mass transit systems were decaying and being abandoned in many cities and areas, and America's soaring energy thirst was apparently going to be slacked by endless streams of foreign crude imported from such regions as the Middle East, Africa, and South America—at two dollars a barrel or less!

But the oil embargo of 1973-74 changed all that. The OPEC cartel took advantage of the Yom Kippur war to escalate the price of oil beyond anyone's most dreadful nightmares. The finite nature of the world's petroleum reserves became widely apparent, even though a handful of energy experts had been sounding a warning about an impending energy crisis for nearly a generation. Vast sums of money, totalling billions of dollars, were transferred from the industrial world to the OPEC nations. Recession, stagflation, gasoline shortages, heating-oil price spirals, and the specter of falling standards of living loomed as chronic problems to be endured in the 1980's. Our modern Rip Van Winkle might wish he had never returned to consciousness!

Against the background of our contemporary energy realities, however, many Americans have remembered that the United States contains within its borders the greatest coal reserve in the world. It has been said that the United States is to coal, as Saudi Arabia is to oil. Estimates of U.S. coal reserves run to at least 2.9 trillion tons, and our recoverable coal resources are predicted to be sufficient to meet our energy needs for two to five centuries.

Coal has been a familiar substance for several millenia. The old testament refers to coal; and Marco Polo in the thirteenth century related to an incredulous Europe that the Chinese, whom he had visited, warmed themselves by "burning stones." However, coal did not come into its own until it was harnessed to power the industrial revolution. For generations now, coal has energized our transportation, purified our steel, turned the wheels of our industry, and heated our homes.

But when other forms of fuel rose in competition, the polluting characteristics inherent in the combustion of raw coal, and the relatively complicated problems of coal mining, served to reduce its energy-market share. Currently, for example, it is estimated that coal is meeting less than 19 percent of America's total energy requirements, although it constitutes approximately 85 percent of our total fossil fuel energy resources.

The United States has no option, but to turn increasingly once again to coal, in order, realistically, economically, and practically, to meet our immediate and imperative energy needs—especially in the new economic world created by OPEC, and in response to the actual chaos and potential turmoil endemic in many petroleum-producing countries.

For a variety of economic, political, and even ideological reasons, the OPEC cartel has demonstrated itself committed to an apparently endless process of leap-frogging petroleum price increases. While the official OPEC ceiling price is set at approximately $23 per barrel today, "spot market" prices have reached at least $40-$45 per barrel and are expected to jump further in the immediate future, triggering an even higher OPEC ceiling in the months ahead. Some oil economists do not find it beyond imagination to predict prices of $90 per barrel as standard by the end of the 1980's, or even sooner.

Moreover, OPEC countries have learned to "tease" the world petroleum market by alternately tightening and loosening the oil taps, thus driving up the price of crude, reinforcing the perception of OPEC's economic power, throwing the industrial world into disarray and disunity, and exerting influence on the internal and international policies of oil-consuming and energy-dependent nations.

Complicating our national energy future are the flaws that have appeared in our program of nuclear power development, an energy source that was once touted and heralded as a near-panacea for meeting our energy needs. The Three Mile Island accident and the apparently naive state of nuclear art and technology have raised widespread suspicions about the unexamined and unchallenged multiplication of nuclear powerplants. Coal now appears more attractive than nuclear energy.

But the "second great age of coal" will not be a mere replay of the smokey late nineteenth and early twentieth centuries. A new factor in shaping the future of coal usage in America is the growth of an appropriate concern for the environment. We owe a measure of gratitude to those who have called attention to the hidden liabilities of the indiscriminate burning of partially-processed fossil fuels. Little would be gained from the abundant use of coal if, at the same time, such unregulated consumption were to significantly contribute to the spread of chronic air pollution.

What is called for now is a balance between our inescapable

need to use greater quantities of coal to meet our growing energy demands, on the one hand, and rational consideration, on the other hand, for the total environment in which we live and in which are our children and grandchildren must grow to maturity. What is required is a concept of "environmental realism."

In relation to the growth of coal usage, this means the development of second- and third-generation technologies that will change coal from its raw state into more ecologically acceptable forms, or which will eliminate most of the polluting effects of coal combustion.

For instance, the $20 billion Byrd amendment, which I offered to the Interior Appropriations bill and which recently passed the Senate, provides for the promotion of, among other things, the clean-burning coal-derived alcohol called methanol, as a viable alternative to our more limited fossil fuels. Methanol can be competitively produced from coal at today's energy prices in a fuel-efficient fashion. The technology to produce methanol from coal already exists. In fact, studies by the Department of Energy and by the Office of Technology Assessment conclude that methanol can be produced for between 40 to 80 cents per gallon. Most ethanol, made from farm products, costs about 80 cents to $1.50 per gallon to produce. The advantages of methanol from coal extend beyond production costs, however. Methanol is far cleaner than gasoline when it is produced and when it is burned. It can be substituted for gasoline, diesel fuel, kerosene, and home heating oil. Methanol production is clean and free from hydrogen emissions, which makes it cleaner than a typical oil-refinery operation.

Moreover, I have strongly endorsed the construction of two solvent-refined coal demonstration projects, SRC-I at Newman, Kentucky, and SRC-II plant at Morgantown, West Virginia. Both projects will produce clean fuels from coal. The SRC-II plant at Morgantown would convert high-sulphur coal into a clean-burning liquid boiler fuel and gas byproducts. If the demonstration plant there proves as successful as it promises, it could eventually be enlarged to commercial size, converting 30,000 tons of coal a day into the energy equivalent of 100,000 barrels of oil. In the construction and operation of both SRC plants, environmental factors will be of utmost importance, for these efforts are intended to serve as paradigms for whole new industries.

In addition to new forms of fuel from coal feedstocks, new technologies are currently in use or being researched to consume

coal more directly. The versatile fluid-bed boiler process is being applied effectively in approximately twenty locations, of varying scopes, at this moment. This process, when utilizing coal, mixes coal of a fine consistency with limestone in an agitated state, while burning; the limestone absorbs the sulphur pollutants and releases an extremely clean emission into the atmosphere. Though most of the fluidized-bed boilers are pilot projects, the notable new power-plant located on the campus of Georgetown University is proving so successful that it is reportedly convincing many energy experts of the feasibility of the industrial combustion of coal even in highly populated urban and residential neighborhoods.

The point is that technology exists, or is under research now, for the environmentally-sound and fuel-efficient processing and consumption of coal, and this is the result of a logical coalescing of the energy-imperative with environmental concerns.

The great John C. Calhoun authored a concept in our republic called the "doctrine of the concurrent majority." Simply stated, it means that every vital interest in this country should be given a voice and consideration in forging those decisions that touch it significantly, before a final conclusion is reached and a consensus is formed. We need coal, and we need clean air; we must mine coal, but we must consider the rights of those who live on the land. As responsible citizens, we should recognize that we are searching for a consensus, not an "either/or" concerning coal and the environment, but a "both/and."

The distinguished Judge Learned Hand once declared, "the spirit of liberty is the spirit which is not too sure that it is right." That has been an attitude that has set the stage for some of the greatest advances in our history, as every voice found free and responsible expression.

Where energy is concerned, we do not enjoy the time-luxury that Rip Van Winkle could boast, but our energy progress must be wise and far-sighted. All of us are part of America, and all of us will help to determine America's future.