

ENERGY FUTURE REPORT OF THE ENERGY PROJECT  
AT THE HARVARD BUSINESS SCHOOL  
Edited by Robert Stobaugh and Daniel Yergin  
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Reviewed by

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The energy crisis, which was identified in 1972 by the United States Supreme Court,<sup>1</sup> properly is the subject of much concern, analysis, and writing.<sup>2</sup> The current and future social and economic problems arising from this Country's heavy reliance on non-renewable sources of energy,<sup>3</sup> such as domestic and imported oil,<sup>4</sup> natural gas and coal, require meaningful examination and recommended solutions.

One attempt to examine the complex energy problem is set forth in ENERGY FUTURE, which is edited by Robert Stobaugh and Daniel Yergin, as the report of the Energy Project at the Harvard Business School. The major conclusion reached by the report is that production from the four conventional sources of domestic energy—oil, gas, coal and nuclear power—will not be as great as predicted, and, at best, will produce only one third to one half of the additional energy the U.S. will need over the next decade. As a solution, ENERGY FUTURE advocates that conservation and various non-conventional sources of energy, including solar, can fill the gap. Its recommendation is based on three premises. First, the energy crises and price rises of 1973-74 and 1978-79 were not isolated instances but part of a "major transition." Second, the best way to achieve economic growth is through reliance on the free market.<sup>5</sup> Third, attempts must be made to deal with the questions of who is to pay for energy development and who is to profit.

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<sup>1</sup>Federal Power Comm'n v. Louisiana Power & Light Co., 406 U.S. 621 (1972).

<sup>2</sup>See e.g. National Geographic (Feb. 1981).

<sup>3</sup>Professor Commoner has stated that "[n]early all the energy now used comes from nonrenewable sources. As a non-renewable source is depleted, it becomes progressively more costly to exploit, so continued reliance on it means an unending and exponential rise in price." Commoner, Reflections, *The Solar Transition—II*, THE NEW YORKER, Apr. 30, 1979, at 46.

<sup>4</sup>The price of OPEC oil has increased from \$1.80 per barrel on January 1, 1970 to \$12.09 per barrel on January 1, 1977 and to \$30.00 per barrel on January 1, 1980. *Wash. Post*, Dec 19, 1979, § A, at 22, col. 4. It recently was reported that Saudi Arabia increased the price of their production by approximately 12 percent to \$36 a barrel, which is \$1 a barrel higher than their usual price. *New York Times*, Feb. 10, 1980, § D, at 12, col. 5. One observer has commented:

As recently as 1972, oil imports cost us less than \$5 billion. Seven years later—1979—our tab for imported oil is \$65 billion. We are transferring that much wealth *annually* to the oil-exporting nations. How much is \$65 billion? It is, for one thing, \$295 for every one of us, or \$1,180 for a family of four.

Tobias, *The Only Article on Inflation You Need to Read*, ESQUIRE, Nov. 1979 at 49, 50.

<sup>5</sup>G. Will states:

"The crises of American capitalism is a crises of capital . . . One study suggests that in the 1980s the need for externally raised equity will be \$275 billion . . . in the next five years Americans will pay OPEC approximately \$500 billion, almost half the present value of all companies listed on the New York Stock Exchange" *Wash. Post*, Feb. 12, 1981, § A at 19, col. 2.

ENERGY FUTURE, as revised, is comprised of nine chapters and two appendices. The early chapters deal with oil, then natural gas, coal and nuclear. Conservation, which the editors label the "key energy source," and solar power are discussed in the next chapters. Chapter Eight is entitled "energy wars" and deals with the book's argument favoring decontrol of domestic oil and gas prices.

Chapters I and II of the report deal with oil. It starts with the assertion that geology denies the possibility that domestic oil production is the way to lower oil imports. In 1970, U.S. oil production peaked at an average of 11.3 million barrels a day. As production declined import restrictions were abandoned and by 1979, 47% of the nation's energy consumption consisted of imported oil. American oil companies used to dominate the international oil market. In 1955, the five major American based oil companies produced two thirds of the oil for the world oil market with the remaining one third being produced almost entirely by two British companies.

In 1960 the Organization of Petroleum Exporting Countries (OPEC) was formed.<sup>6</sup> OPEC now accounts for over 90 percent of the world's exports of oil. Although OPEC member nations can set prices unilaterally, they have no mechanisms with which to regulate output. According to ENERGY FUTURE, world oil supplies will continue to be produced by OPEC, which is dominated by Saudi Arabia.<sup>7</sup> But no matter what happens to Saudi Arabia's internal political system or its role in OPEC, substantially higher oil prices will result.

ENERGY FUTURE considers whether a domestic American oil policy can lower the rate of imports.<sup>8</sup> Three different policies are considered: (1) deregulate oil prices and quickly grant offshore oil licenses, (2) increase production with the use of such unconventional means as enhanced recovery and shale oil, or (3) divestiture of the big oil companies. It is concluded that none of these proposed solutions will increase current production over its present level of about 10 million barrels daily. Significantly and probably to the delight of the oil companies, the report concludes "there is no evidence that divestiture would have any meaningful impact on the future of domestic supplies of oil."<sup>10</sup>

ENERGY FUTURE's chapter on natural gas emphasizes its significant role in the past and in the future. In 1978, natural gas provided one quarter of American energy consumption. Only five percent of this environmentally desirable energy was imported. Although domestic natural gas production peaked in 1973, it is estimated that there is enough domestic natural gas, on and offshore, to maintain current levels of consumption for at least 25 to 30 years, but at much higher prices.<sup>11</sup>

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<sup>6</sup>In 1971 OPEC achieved "their first clear-cut victory over ... the West ... [with] what was considered at the time to be a large price increase: fifty cents a barrel." ENERGY FUTURE at 25. (All page references are to the revised edition of ENERGY FUTURE.)

<sup>7</sup>The only other possibly significant sources of oil for the 1980's are China and Mexico ENERGY FUTURE at 35-36.

<sup>8</sup>Even though American policy is to reduce imports of oil, between 1973 and 1979 the amount of oil imported by the U.S. had almost doubled to the point where half the oil used in the U.S. was imported. *Id.* at 2.

<sup>9</sup>*Id.* at 48.

<sup>10</sup>*Id.* at 51. *But see* Adams, *Horizontal Divestiture in the Petroleum Industry: An Affirmative Case*, in HORIZONTAL DIVESTITURE IN THE OIL INDUSTRY, 7, 13 (E. Mitchell ed. 1978).

<sup>11</sup>ENERGY FUTURE indicates that there are possibilities for supplementing the U.S. supply of natural gas. For example, Mexican and Canadian natural gas will supply approximately five percent of total U.S. gas consumption. *Id.* at 78-79.

Chapter Four of *ENERGY FUTURE* deals with coal, a significant source of potential energy.<sup>12</sup> However, in 1978, coal provided less than 20 percent of America's energy needs. Although we have significant coal reserves, there are several problems which prevent a quick short term, full scale transition to coal. Electric utilities are hesitant to shift to coal. Transportation is uncertain as railroads may not have the capacity and/or capital to meet demand. Coal producers are reluctant to open new mines without long-term contracts. There also are significant environmental barriers associated with coal production. Human barriers also are present since the coal labor force has a history of strife and unrest. The report pessimistically concludes:

"taken together, the three types of barriers to the massive short-term utilization of coal . . . stand in the way of our relying heavily on coal as an alternative to imported oil."<sup>13</sup>

However, according to *ENERGY FUTURE* the long-term outlook for coal may be better. While coal production can not replace imported oil, it will steadily grow primarily because of the entry of the large oil companies into the production of coal. The entry of these large companies adds new and large scale bases of corporate, managerial and technical resources to the coal industry. The second reason that coal will have a significant future role is that new technologies are emerging. These focus on making the direct combustion of coal more efficient and on using coal to make methane and oil.<sup>14</sup>

*ENERGY FUTURE*'s chapter on nuclear power is interesting. As recently as five years ago, federal government plans called for nuclear power to provide approximately 30 to 40 percent of American electricity by the end of the 1980's. Today, the prospects are much less. This is due in part to the decrease in growth of demand for electricity.<sup>15</sup> One of the biggest problems confronting the industry is how to dispose of the spent fuel from nuclear power plants. In the 1960's it was assumed that this would be taken care of through reprocessing. However, in the 1970's it was argued that since the plutonium produced could be used to make nuclear explosives, reprocessing posed the threat of the proliferation of nuclear weapons. In October, 1976 the nuclear industry was warned by the Ford Administration that fuel reprocessing might become unacceptable and six months later the Carter Administration imposed an outright prohibition, thus transforming "a relatively minor technical problem, the choice of specific methods to dispose of radioactive waste materials, into an acute operational problem—what to do with spent fuel."<sup>16</sup>

Even if reprocessing was allowed, the problem of how to isolate radioactive wastes from the environment would remain. The government approach has been to focus on one large scale repository. *ENERGY FUTURE* suggests that a policy of encouraging the simultaneous development of several smaller repositories in several different geologic media should be followed. Interestingly, *ENERGY*

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<sup>12</sup>The United States has approximately 25% of the world's known reserves of coal. *TIME*, June 11, 1979 at 75.

<sup>13</sup>*Id.* at 113.

<sup>14</sup>*Id.* at 118-124.

<sup>15</sup>*Id.* at 132-133.

<sup>16</sup>*Id.* at 149.

FUTURE does not suggest how state and local opposition will be overcome. However, during the balance of this century, it concludes:

“nuclear power offers no solution to the problem of America’s growing dependence on imported oil”<sup>17</sup>

The next chapter of ENERGY FUTURE discusses conservation, which is viewed as a separate energy source. Conservation should not be viewed as “the product of an anti-growth crusade led by the granola-chomping children of the affluent”<sup>18</sup> There are, however, four obstacles to productive conservation. The first is that conservation efforts are fragmented, decentralized and difficult to organize and control. Second is that energy experts are used to giving advice based upon future production in contrast to reduced demand. The third obstacle is the view that the rise of energy prices will automatically result in an appropriate amount of conservation activity without any government action or change of policy.

Three areas in which conservation can be achieved are examined by ENERGY FUTURE. First, increasing the automobile’s efficiency is advocated as opposed to attempting to reduce dependence upon it. Second, in the manufacturing industry, conservation can be achieved by “improved housekeeping,” recovery of waste (heat and other materials) and greater reliance on cogeneration.<sup>19</sup> Cogeneration and other conservation methods could cut industrial energy use by one third with a total capital investment of approximately 40 billion dollars less than that required for investment in conventional energy sources.<sup>20</sup> The third area for conservation is in retrofitting existing structures and in the design and construction of new buildings.

ENERGY FUTURE notes that a study by the National Academy of Sciences demonstrated that by the year 2010 very similar living conditions could be provided using twice the energy used today, or 20 percent less. A study done for the American Physical Society showed that in the year 1973 the same standard of living could have been achieved with 40 percent less energy.<sup>21</sup>

Chapter Seven is entitled “Solar America.” Solar energy, the use of thermal (heating and cooling) applications, fuels from biomass, and solar electric methods, could produce one-fifth to one-fourth of America’s energy needs by the year 2000.<sup>22</sup> According to ENERGY FUTURE the barriers to utilization of solar energy are institutional and economic rather than technical. It is concluded that no drastic change in life styles would be required from greater reliance on solar energy.

Chapter Eight, which is entitled Energy Wars, was added in the revised paperback edition. According to the editors, Americans wish to find a single

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<sup>17</sup>*Id.* at 165.

<sup>18</sup>*Id.* at 169.

<sup>19</sup>Cogeneration is the generation of electricity produced from the burning of certain waste by-products of an industrial process or by recycling energy in a sequential power-generation process. Drennan, *Considering the Cogeneration Commitment: Do Government Incentives Tip the Scales?*, 1 *Energy L.J.* 297 (1980).

<sup>20</sup>ENERGY FUTURE at 200-201.

<sup>21</sup>*Id.* at 221-222.

<sup>22</sup>Solar space and water heating could provide the equivalent of 2 million barrels of oil per day. Wood as a fuel could provide, in the short term, another 3 million barrels per day. The use of municipal and animal wastes as a fuel could provide another 1.5 million barrels per day. *Id.* at 231, 238 and 248.

energy villain. This national obsession prevents a full confrontation with the energy problem. One of the obstacles to a meaningful confrontation is the rise in value of U.S. oil and natural gas reserves due to OPEC's price increases. Notwithstanding, ENERGY FUTURE advocates decontrol of domestic oil and natural gas prices.

It is stressed by ENERGY FUTURE that this country can not rely on one big technological fix to solve the energy problem. President Carter's approach was different from his predecessors since he moved from emphasizing domestic production to increased conservation. Mr. Carter also increased support for solar energy while decreasing support for nuclear power. However, President Carter's administration also had its "miracle fix"—the synthetic fuels program, which diverted attention from implementing conservation measures. In addition, the revenues from the windfall tax, passed after President Carter ordered a gradual decontrol of oil prices between June 1979 and September 1981, were allocated so that only four percent would be spent on conservation and solar energy.<sup>23</sup>

The overall conclusion expressed in Chapter Nine of ENERGY FUTURE is the non-controversial statement that American policy should foster a system of balanced energy sources.<sup>24</sup> Measures such as the following are advocated: (1) rapid leasing of offshore oil and gas properties under strict environmental regulations; (2) price decontrol of domestic oil and natural gas, including "old gas"; (3) elimination of the windfall profits tax on newly discovered oil; (4) government assistance for such technologies as coal gasification and liquefaction and shale oil; (5) ascertainment of acceptable ways to dispose of nuclear reactors' spent fuel,<sup>25</sup> and (6) use of financial incentives to encourage the use of conservation and solar energy.<sup>26</sup>

ENERGY FUTURE should be read. It is not a lawyer's book but one necessary to understand our common experience as a member of an energy dependent society. Although ENERGY FUTURE is a meaningful addition to our knowledge, it does not always communicate with "precision, cogency and force."<sup>27</sup> This disability should be ignored.

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<sup>23</sup>*Id.* at 276-284.

<sup>24</sup>One reviewer has called ENERGY FUTURE "bloodless" and "tedious". E. Gerjuoy, 66 A.B.A.J. 1245 (1980).

<sup>25</sup>*Id.* at 291.

<sup>26</sup>*Id.* at 295.

<sup>27</sup> *Cf.* THE NEW YORKER, Dec. 4, 1978 at 41.