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## ECONOMICS, POLITICS AND THE FUTURE SUPPLY OF ENERGY SOURCES

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High degree forward linkages created by oil and natural gas consumption was sufficient "justification" to regulate energy prices. The "welfare triangle" was artificially enlarged, and the economy as a whole indeed reaped benefits therefrom. It was workable, then. But the economy has since been experiencing macroeconomic dislocations. To avoid future payments of current policy mistakes, to ensure continued and steady economic growth, and to assure future energy adequacy/abundance, enhanced investment incentives are rational imperatives that merit serious consideration.

### 1. INTRODUCTION

Desirable properties, in combination with their immense in-situ deposits, made oil and natural gas the chief sources of energy in industrialized nations. They are relatively clean to burn, high in BTU content, can meet a wide range of economic and social needs and could be obtained at relatively low cost. They have become instrumental in our efforts to develop the economy more rapidly, and economic growth has since become a function of energy consumption.

Throughout the economic history of world population, it has been mankind's ability to substitute fossil fuel energy for that of manual or animal labor in the production processes that dictates the pace of economic growth. Under normal economic and political circumstances, there could be a nearly one to one correspondence. As the U. S. consumes approximately one-fourth of energy produced in the world, the U. S. has also been producing one fourth of gross world product. The U. S. average annual growth rate in energy consumption between 1967 and 1977 was 2.8 percent and the real average annual GNP growth for the same period was 2.9 percent. Thus, to maintain and to improve the economic condition of a nation, increased production of conventional sources of energy and the development of alternative forms of energy are indispensable. The future of U. S. economy to a significant degree depends on the future supply of domestically produced energy sources.

### 2. CONCERN

The World Population Conference held in Bucharest, 1974 echoed deep concern over the unprecedented population growth rate of two percent per year. For at this rate the world population could be doubled in less than thirty five years. Outside the Conference, the public was even more concerned over the more rapid increase in resource demand, especially the demand for fossil fuel energy, both on the aggregate and on the per capita basis. Total world energy consumption in 1925 was  $44,249 \times 10^{12}$  BTUs. By 1972, it soared to  $237,166 \times 10^{12}$  BTUs, a more than five-fold increase over less than half a century. Or, on the average, the increase amounted to 11.4 percent per annum. Possibly more disturbing is the fact that: (i) the most drastic increases occurred after the Second World War, corresponding to rapid economic development of the period, thus pointing to sustained energy demand increases in the future by both the DCs and the LDCs; (ii) energy transformation has significantly shifted away from the more abundant known reserve of coal to petroleum and natural gas whose known reserves in terms of BTU content are far less abundant; and, (iii) U. S. oil reserves declined by 17 percent for the 1964-1973 period while that of natural gas declined by 20 percent. Present concern over the adequacy of domestically produced conventional sources of energy extends far into the future.

### 3. ECONOMICS AND RESERVE ADEQUACY

For a more discerning individual, concern is more over the possible disruption of economic and social order due to rapid increases in the prices of these key resources. Among the general public, however, concern arises mostly because of the trend of rapid increases in oil and gas consumption as reflected in their price increases. This has led to the realization that these resources are quite finite in quantity.

Two points here need clarification: (i) A mineral resource is not termed a known reserve unless it has been geographically pinpointed and is deemed to be economically feasible for extraction. For example, although the physically extractable oil from shale is 189 percent more abundant in BTU content than that of oil and natural gas combined in the U. S., and despite the fact that the first substitute crude oil was successfully manufactured as early as 1694 by retorting shale and cannel coal in England, shale was neither considered a resource nor a reserve. It had no economic value because shale deposits had neither been identified in the U. S. nor could oil be economically derived therefrom with seventeenth century technology. And, (ii) should a resource's price increase due to a temporary supply shortage for the lack of known reserves, the probability is high that this particular resource's reserve could be increased, at times significantly, when hitherto not-yet-considered lower grade or harder to reach deposit sites now become economically viable to be mined.

As recent as 1979, the Chief of the U. S. Geological Survey's Office of Energy stated that research results as arrived at by independent institutions all point to the conclusion that energy resource potential in the U. S. will not be a limiting factor in sustaining U. S. oil and natural gas production for at least the next twenty to fifty years. The limiting factor will be the rate at which geologists can discover these oil and gas deposits and convert them from potential to real marketable energy forms. How much and how soon can this potential be translated into realized energy forms would be a function of, among others, energy pricing, the resultant profit margin, investment incentives, concomitant technological advances in the field, government land leasing policy and the overall political and economic climate. Political will in combination with free market pricing mechanism holds the key to the future adequacy of domestically produced energy forms and hence the future of the U.S. economy.

#### 4. PRICING MECHANISM AND RESOURCE ALLOCATION

Under normal circumstances, the demand for oil and natural gas determines their respective price-profit and therefore their rates of production. And it is their current market prices that determine their production-reserve ratio today and their reserves several years hence. Their reserve adequacy and depletion can be properly understood only when market mechanisms and market forces are correctly perceived. In light of this, the dwindling oil and natural gas reserves in the U. S. between 1964 and 1973 can be seen as a logical sequence of events shaped by prevailing market forces. For with the dramatic increases in oil demand after WW II and constrained productive capacity at that time, high oil prices yielded higher than usual returns on investment. High profit rates thus attracted new entrants and intense capital investments into the oil industry. And to achieve a sustained high rate of return on oil investments, producers endeavored to lower production costs. Attention was thus focused upon the Middle East oil fields. Rates of return on foreign oil investment not only surpassed but, between 1955 and 1958, more than doubled those of mining or manufacturing or both categories of industries. Consequently oil investment abroad increased while investment in the domestic sector of the industry declined, along with explorative activities, finds and reserves. This lowering of domestic oil reserve, therefore, should in no way be construed to mean that the U. S. oil deposits were being rapidly depleted.

In general, resource shortages experienced so far are "man-made" and have always been resolved via the interplay of market forces and accompanying technological advances. For instance, natural rubber prices were artificially forced up in the 1920s due to cartel actions. Similar to DCs' current demand for oil and oil products, demand for natural rubber then was quite inelastic. In the short term, industrial users had to pay the hiked price for it because they were unable to reduce consumption to any significant degree. However, as a result of the high natural rubber prices, pressure was brought to bear on the market to intensify research and development in search for substitutes. Thereafter, synthetic rubber was developed which then replaced the function of natural rubber in many productive processes. Natural rubber prices were forced down and there was more abundant supply of rubber--both

synthetic and natural--on the market as a result.

Similar instances of high price-profit triggered input substitutes may be recalled. The Chilean nitrate cartel of the early twentieth century led to the eventual commercial marketing of fixed nitrogen for fertilizer by synthetic producers. There also has been the substitution of aluminum for steel, lead, copper and tin, of plastics and ceramics for metals, synthetic fibers for more expensive materials such as wood and cotton products, and nickel from lateritic instead of the usual deposits.

With the progression of time, the accumulation of knowledge is likely to enhance human ability to manipulate or master material resources that will render future development of not only substitutes but also substitute processes easier, faster and less costly. Profit motivation will be the driving force behind it all. The substitutes which market forces are endeavoring to develop most are machines for labor. As for basic minerals in general, it may be proffered that due to the increasing interchangeability of their uses in the productive processes, their respective economic value will face stiff competition from each other. Expressed in another way, the quantity of basic mineral resources may increase over time due to their increasing interchangeability as factors of production.

The above illustration may be applied to the more urgent question of possible fossil fuels 'depletion' which constitutes a unique situation in the history of resource use. No demand for an industrial input has increased at a more rapid rate than that for oil and natural gas since the mid-1940s. All DCs rely on energy sources for economic development and survival, and most of the developed economies have been highly dependent on oil imports.

The reality of energy shortage that has led to the curtailment in space heating, in industrial production, in mechanized farming, in transportation and in recreational activities has thus made consumers and policy makers alike question its causes and attempt to find relief therefrom. The key lies in the free reign of the invisible hand, with the government's role being that of incentive provider and coordinator.

##### 5. POLITICS AND ECONOMICS

In earlier years, in order to assure continued economic growth via the consumption of large quantities of available oil--both domestic and foreign--it was politically expedient and macroeconomically 'justifiable'

to discourage domestic energy prices from rising. Price ceilings on oil and natural gas were introduced. Consequent upon this policy, high demand and consumption led to steady economic development. The 'welfare triangle' was artificially enlarged and the economy as a whole also reaped benefits therefrom. It was workable then.

Price ceiling on oil and natural gas was "justifiable" and workable then because imported oil registered not only stable but at times declining prices. For instance, prices of petroleum products at leading ports of origin in the Persian Gulf in 1960 was estimated to be ten cents per gallon. By 1972, the per gallon oil price from the same origins averaged only 9.6 cents. In between 1960 and 1972, the per gallon oil price from the same origins never exceeded 1960's ten cents per gallon. Thus, with no apprehension over an oil embargo and with cheap import oil ample in supply, it was "justifiable" to artificially keep the domestically produced oil and natural gas prices in check. Full employment, growth, low welfare payments, prosperity, comfort and social wellbeing could to a large extent be attributed to the government intervention in the energy industry then.

However, given the more recent developments in the energy industry, in order to ensure future economic stability and continued growth, the role of the government should be to assure that future energy demand will be met by stable prices, ample supply and domestically produced energy sources. This assurance will no longer be forthcoming from without. Reliance can only be placed on increased domestic production, whether the energy sources be conventional or otherwise. A casual perusal of recent developments in the oil market illustrates this point. The average price of crude oil in 1971 was approximately \$1.85 per barrel. It rose to nearly \$5.00/bbl in the latter part of 1973. In January 1974, OPEC raised its crude price to \$11.65/bbl. And in September 1980, Saudi Arabia was persuaded to raise its price from \$28.00 to \$30.00/bbl as a compromise so that other OPEC members would refrain from raising their price beyond the \$30.00 to \$38.00/bbl range. Within this decade, the world has witnessed a nearly twenty fold increases in the nominal price of crude oil. International oil politics, reinforced by the forces and considerations of basic economics, has in a few years radically changed the complexion of world power structure--both political and economic. Not only that there is no assurance that oil price on the international market will not witness further rapid increases,

there is no guarantee that oil embargo will not be resorted to as a result of international political upheavals.

The U. S. should have been taught a lesson. And the lesson is that short term domestic political expediency should now take into full account the workings of market mechanism in assuring adequate future supply of vital inputs such as oil and natural gas. To continue to disallow the free play of market forces in the energy sector today could spell dire economic consequences for decades to come. In light of the oil embargo in 1973/1974 and its resultant social and economic ills, long term national interest, economic stability and social welfare should be the sole criterion for mapping future strategies. To minimize social upheaval, to safeguard economic stability--if not prosperity-- and to assure national security, it is time that a return to marketplace determination of production/consumption of conventional sources of energy is in order.

In a competitive market, the equilibrium price is determined by the demand for and the supply of a given commodity. Over or underproduction results when the price of a commodity is artificially set. Historically, price support for selected farm products led to over supply, and domestic price ceiling for oil and natural gas, when confronted with the unexpected such as an oil embargo, led to shortages of the same. To dispose of surplus grain, Public Law 480 was enacted at taxpayers' expense and oil that is demanded at the international market-price unobtainable on the domestic scene has to be imported from abroad. So long as domestic producers are constrained by government actions disallowing free market oil price, then the marginal barrel that is produced would be from competing sources abroad. It is a luxury which the U. S. economy can ill afford any longer.

#### 6. CONSEQUENCES OF GOVERNMENT INTERVENTION

Past government intervention in the energy sector has so far led to the following consequences: (i) consumers of domestically produced oil and natural gas are given misleading signals as to the real value of energy and hence their quantities demanded have been greater than vouched for by free marketing pricing. Misallocation of scarce resources results. (ii) Domestic energy producers who have been denied of market value of their products are effectively discouraged from accelerated investment initiatives. Future supply of domestically produced energy is in doubt. And, (iii) substantial outflow of national wealth to oil exporting nations results in

not only declining value of the U. S. dollar but also high domestic unemployment and inflation/recession. These are only a few of the major adverse consequences of past government intervention in the energy market. 1979's U. S. oil import expenditure exceeded the \$45 billion mark. President Carter himself is given to admit that sustained oil imports have caused domestic increases in unemployment. For every additional \$5 billion increase in oil imports, the estimated number of domestic jobs lost is 200,000. If one takes into account the lost productivity, the increased welfare payments, the foregone multiplier effect that would have materialized if these 200,000 had been gainfully employed, and the associated social ills resulting from the above, then one can more readily grasp the full extent of the high cost of energy imports and the danger of energy dependency on foreign sources.

#### 7. DESIRABLE ROLE OF THE GOVERNMENT

Timely remedy is imperative. Increased domestic production of oil and natural gas is imperative. Investment incentives must be provided and enhanced. Determination of energy prices need be restored to the market. And the resulting profits must not be tampered with. In ignoring economic dictates in favor of short term political consideration, and in curtailing the market dictated profits to the domestic energy industry, the nation deprives itself of investment and job opportunities associated with the industry while dollars keep flowing out of the domestic economy.

The government should in as much as possible stay out of the marketplace. The government is less efficient, more wasteful and slower in making timely and flexible adjustments as the private sector. And, the government is not equipped to provide the expertise in production-distribution or to make wise investment decisions as the private sector is accustomed to. By comparing the relative economic performances of market-orientated or government-operated enterprises here or abroad, one readily sees the relative efficiency of the former. The government's role in the economy is to assist where needed and to abstain from intervention wherever possible. "Former Treasury Secretary William E. Simon was skeptical of the government's role in the market. Arizona Senator Paul J. Fanning was critical of government's ineptness in investment decision making. And FPC's Commissioner Rush Moody, Jr. openly acknowledged the out-of-place role of government in the private sector."

The function of the government is to promote rather than to restrict, to protect rather than to inhibit, to be responsive rather than being excessively 'creative.' This is not to state that the government has no role to play. It does. The founding fathers of the nation gave federal government the powers "to protect and promote economic interests and at the same time limited the power of the states to control economic activity." The Homestead Act of 1862, the Morrill Act of the same year permitted farmers to acquire free lands in the West and to provide support for the creation and operation of state land grant colleges, the Sherman Anti-trust act of 1890, the Federal Reserve Act of 1913, the Federal Trade Commission and Clayton Acts of 1914 etc. were all constructive and timely public acts designed to strengthen the efforts to maintain a competitive and free economy. But intervention to dictate the rate of profit and the arbitrary setting of price ceilings is in effect to discourage a given industry to grow and be productive. On an issue as critical as the future domestic adequacy of energy sources, decision makers should no longer continue the government's strangle hold on the energy sector. The proper function of the government in the energy sector now is to stimulate investment and to minimize existing controls. Long term economic considerations have for too long been sacrificed for short term political expediency. It is a time to change.

#### 8. ECONOMICS AND FUTURE ENERGY SUPPLY

Recognizing that price ceiling could only curtail domestic energy production and increased oil imports, President Carter did finally initiate the phased decontrol of oil prices to be completed by late 1981. It was a step in the right direction. But contrary to the most basic economic common sense, the President also asked for the levying of 'windfall' profit taxes. The government once again injects itself into the private sector to dictate and to alter business behavior. Claiming that phased decontrol would bring 'non-legitimate' profits to the oil industry, the government once again effectively curbs the investment incentives of oil producers. What the government returned with one hand, the government simultaneously took away with the other. Politics in the marketplace could thus prove to be detrimental to the long term interest of the national economy and security.

Additional taxes on the revenues needed to finance an expansion of domestic oil and natural gas supplies would be counterproductive and would represent an unwarranted burden on the energy industry. Without the

windfall profit tax, governments would have already received from 50 to 60 percent of any increase in the wellhead price of crude oil. Besides, current tax laws impose an inflation tax on capital by failing to recognize the sharply increasing replacement cost incurred in finding, developing and producing new reserves. With what is left to the oil industry after the 'windfall profit' tax, the oil companies would not have adequate investment expenditure to increase U. S. oil and natural gas production by the equivalent of 1.5 million barrels a day by the mid 1980s as desired. To increase oil supply, more extensive and more costly efforts would need be made to increase oil production from the old fields. This would include reconditioning existing wells, drilling new wells in existing reservoirs, 'installing conventional waterflood and pressure maintenance programs and other projects for additional production stimulation.' Either to maintain or to increase known reserves, accelerated prospecting is also indispensable. All these would require ever mounting capital expenditures by the energy industry.

According to the government's own estimate, the increase in revenue by the oil industry during the decontrol phase approximate \$9 billion. With the implementation of the windfall profit tax, the industry would be left with only \$6 billion to manoeuvre around intended reserve/production increases. In 1978, the industry had already spent \$28 billion and the industry was planning on \$33 billion in capital expenditure in 1979. The Chase Manhattan Bank estimates that, if the U. S.'s growing reliance on oil imports is to be curtailed, then the domestic petroleum industry will have to make capital expenditure in excess of \$430 billion between 1975 and 1985. Two-thirds of this required capital alone will have to be allocated to prospecting for more reserves. In addition, another \$220 billion will be needed for other investments, for the payment of debts/dividends and for additions to working capital. That makes a total of \$650 billion that will be required over and above the operating expenditures. "Approximately one half of the \$650 billion conceivably could be obtained from the capital market and from capital recovery provisions." The other half would have to be derived from profits. However, there is no likelihood that profits of that magnitude could be generated under the conditions imposed by the administration's energy programs. And, in that event, less money could be raised from the capital markets. Therefore, unless the conditions are changed, there is no likelihood that an

adequate capital investment could be made, and that would be to the detriment of the nation's economy. It would then appear that not only the 'windfall profit' tax should not be levied, but to encourage investment incentives that could lead to relative oil and natural gas independence from foreign imports the government should provide tax cuts/credits and/or subsidies to the industry. Examined either from the macro or the micro viewpoint, then, in the nation's search for a solution to the energy crisis, the government's role is not to provide disincentives but incentives, to aid instead of to impede and to seek economic rationale rather than short term political considerations.

Only when the nation is self sufficient in energy supply and when employment is full once again and growth revitalized should the government begin to contemplate equalization measures for a more equitable distribution of benefits. Otherwise, political measures intended to appease the voters can only bring widespread discontent in the future. A recent Federal Energy Administration study itself concluded that: "oil companies have consistently been making capital expenditures in excess of available internally generated funds, . . . a choice may have to be made between allowing higher profits or probably seeing lower capital expenditures for privately financed energy development." Free market pricing of energy sources can increase domestic reserves and will materialize in greater ultimate recovery. More recent studies have all further confirmed the belief that the absence of government intervention in the market place would effectively raise oil and natural gas discoveries and induce more intensive exploitation of currently known reserves. Profit rate must be permitted to rise to the market-determined level so that the desired level of energy investment may today materialize for the stable supply of relatively inexpensive energy sources tomorrow.

## 9. CONCLUSION

Not permitting producers of energy to earn the market-dictated profit would necessarily lead to future low supply of domestically produced energy which could mean not only the continuation but the possible deepening of macro dislocations which the U. S. has been experiencing.

Legislative measures in an effort to cure domestic energy shortage is a direct challenge to historical success of the marketplace. Energy policy should be framed within the confines of economic rationale such that domestic oil production may increase and reliance on foreign imports decline. Controls,

price ceilings, unnecessary regulations and bureaucratic impediments should be removed so that the price of oil and natural gas may seek their equilibrium levels in the marketplace. Thus, and only thus, can conservation naturally and 'effortlessly' materialize and alternative sources of energy for the future earnestly sought.

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