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## Energy is a unique commodity

Such topics as energy economics, energy management, and energy conservation have been discussed broadly. Lately, it has become increasingly apparent that another fundamental of energy should be considered—the uniqueness of energy as a market commodity. In Chapter 21, the definition of economics is quoted from Webster: “a social science concerned chiefly with description and analysis of the production, distribution, and consumption of goods and services.” In light of this definition, it should be noted that energy resources, like other natural resources that support the monetary system, can be and have been considered as goods.

As goods, or a commodity of commerce, energy resources must be considered quite apart from all other commodities, and entirely different rules of monetary economics must be applied if social systems as we know them are to survive. The more advanced socioeconomic systems as they exist today generally consider energy resources in the same category in which other commodities of commerce are considered. Yet energy resources are the single commercial commodity upon which the economic systems are structured.

Man in earlier times recognized the value of energy resources in a way in which modern educated societies do not. Earlier societies, both primitive and advanced, in many cases considered energy resources as a god—the sun god, the god of fire, etc. Today, countless polls taken in the United States have revealed that the average citizen does not think there is an energy problem, only a ploy on the part of business institutions to increase profits. Many believe, in the search for a solution, that the *other guy* should be doing something to con-

serve. We would do well to consider the wisdom of those earlier societies.

Energy is fundamentally matter itself, an observation that Einstein quantified in his energy-matter equation. *No* other resource or commodity approaches this fundamental position.

### Energy resources compared

In comparing energy resources with other resources extracted from the earth, one can use the metal resources as an example: iron, copper, aluminum. Several differences immediately become apparent. Although we have based immense sectors of our socioeconomic structure on these resources, none of them could have been processed into a useful form without the assistance of energy resources. Although we have had each of them available and have utilized each of them for maximum economic benefit, the vast majority of products and goods produced that use them could have been developed eventually by using another metal. Furthermore, in the majority of product applications, the resource material, properly protected, did not deplete to an unusable form, i.e., the automobile made of steel could be recycled by melting it down and using the steel to produce a later generation unit. On the other hand, energy resources, once used by conversion to thermal energy, not only cannot be recycled, but contribute to the imbalance of the system that is the beneficiary of their conversion.

Possibly the most valid comparison of energy resources to other natural resources is the comparison to air and water resources, insofar as the benefit to mankind is concerned. Few, if any, would disagree with the obser-

vation that man (or animal life of any kind) could not survive without air and water. The availability of air on earth is universal, and, contrary to energy resources, it is not considered in any way an article of commerce or an ingredient in the economic formula. Yet air, left to the ecological cycles of nature, is replenishing. The fact that we use it to sustain life does not consume it or use it up. It is only the excessive, nonbiological energy-consuming machines and chemical processes (motivated by energy conversion systems) that tend to degrade the air into a nonusable state. Water, the other resource without which life could not be sustained, is similar in many respects to air. There is, like air and fossil energy resources, only a fixed amount on the earth. However, like air, water is a recycling commodity in the natural order of things. If mankind utilizes water for biological purposes, it recycles and is available for use again at a later time, which time depends little on whether or not it was used. Like air, however, when one departs from the ecological cycle of use and injects into the water a chemical substance that nature has not provided for, the recycle rate is retarded, though the water is still not consumed.

#### **Air and water are quite similar**

From the standpoint of these self-recycling characteristics, air and water are quite similar. The fundamental difference is availability. Air is universally available. Water, however, is quite regional and local in its availability, which has had a striking influence on the pattern of development of civilizations. Early man made his home near freshwater streams,

lakes, and other natural resources. Today, virtually all large areas of population are located on major waterways, which provide for both transportation and water to sustain life. In areas in which water is available beneath the earth's surface, energy in some form is used to raise it to the surface. The local availability of water makes it a good deal different from air in the economic structure. Since all people do not have it available at their point of need, we accept the obligation to pay for it as a utility, recognizing that we are paying the cost of treatment and delivery.

Energy resources differ in two ways from air and water. First, without air and water, animal life could not exist under any circumstances, whereas man could survive in primitive fashion without consuming depletable energy resources. We have however, passed the point of no return in this regard. Mankind could survive in limited regions of the world on the daily energy from the sun, either as a direct form of heat or through the photosynthetic processes of plant life. But ever since the time that man learned to convert the stored solar energy in plant life to fire, the dependence on fire began, and now our entire modern civilization is based upon it.

The second fundamental difference is that, unlike air and water sources, fossil energy resources are not ecologically recyclable. Once the fossil energy has been extracted from the earth and converted to a useful form, starting with heat, nonusable chemicals are formed that will not return to a convertible energy resource.

It is the similarity of energy resources to air and water, coupled with the differences, that makes energy a truly unique commodity.