

Conservation and Engineering

V. Energy Sources

The uses of energy for transportation, space heating, lighting, and the operation of machinery are enormous. The growth in the amount and variety of such uses seems to be almost boundless. Fifteen years ago, thoughtful persons were quite justifiably concerned with the possible exhaustion of our primary energy sources which were and are coal, oil, and natural gas. Such energy sources are not inexhaustible, and the principal disagreements were as to when the well would go dry rather than whether or not it would.

The advent of nuclear fission has, of course, changed all that. Recent estimates indicate that uranium and thorium reserves are equivalent to, perhaps, twenty times the known reserves of all fossil fuels. While energy thus supplied may never be as cheap as that from fossil fuels, it will certainly be available. The prospect of energy from nuclear fission, if fulfilled, makes idle any worry about energy sources. The certainty of fission and the promise of fusion delay important new uses of solar energy and the applications of the winds and tides. Thus, another unhappy prospect is deferred; the necessity of solving the problem of energy storage, since sunlight, wind, and tides are highly irregular in supply. The storage of energy on the scale required for full development of these uneven sources is a long way from a satisfactory solution. Anyone who has ever computed the number of storage batteries or the height of a dam for a given storage job will agree. There will be problems, of course. The disposal of radioactive byproducts is not easy; therefore the

absence of this problem in fusion processes is one of their most appealing features.

Since it is difficult, though not impossible, to imagine a nuclear-powered automobile or truck, it is probable that there will be a demand for liquid fuels for many years. Coal, oil, and natural gas (and shale and tar sands as they are required) will be available for a long time if they are conserved for this purpose. One can foresee a vast chemical engineering development for the conversion of gaseous and solid fuels to liquids.

One may also foretell that probably the best use of our fossil fuels is a chemical raw materials for a large array of synthetic chemical products. It should be much easier to make synthetic fibers and possibly paper and wood substitutes for structural materials from coal, oil, and gas than it would be to do so from carbon dioxide at 400 p.p.m. in the air. It probably will be easier to make such things than to grow them, and it certainly can relieve a great drain on our forests.

Conservation of fossil materials for automobile fuels and for chemical raw materials should become an important concern for all of us. The conservation of our fossil fuels for their best possible uses should be a great factor in accelerating the development of nuclear energy for electric utilities and marine transportation. It would be tragic if such fossil materials were wasted as fuels when nuclear energy can supplant them.