18 January 1980, Volume 207, Number 4428 **SCIENCE**

A Modest Basis for Energy Optimism

Given the sobering nature of today's headlines and somber continuing prospects, it is tempting to press the panic button. However, one should remember that the United States has tremendous resources of people and things and a capacity to unite and function well when the going is rough.

A major source of vulnerability is, of course, excessive dependence on foreign oil, and here at least amid the gloom is a modest basis for optimism. We have stopped increasing our imports and instead begun to lessen dependence on foreign oil. Imports of oil and its products have been reduced about 6 percent. This is only a small fraction of what needs to be done, but there are signs of more substantial reductions ahead in the major items of consumption—gasoline and fuel oils.

It is unpleasant to see gasoline prices increase as they have, but this has been affecting both the short-term and longer-term outlook for gasoline use. During the past 4 months consumption of gasoline relative to that a year ago has decreased about 8 percent. Sales of the heavier automobiles are slow while fuel-efficient models are in strong demand. Further substantial increases in the price of imported oil are inevitable. This will cut consumption of gasoline further and hasten the disappearance of old gas guzzlers. Replacement of the present fleet of cars by fuel-efficient ones would go far toward minimizing our oil import problems.

Consumption of distillate plus residual oil has been lower than a year ago. The full extent of the reduction is not known. However, the American Gas Association has reported that industrial and utility consumption of nearly 0.5 million barrels of oil a day has been replaced by natural gas. Residential consumers are responding to higher prices; there has been some conservation and some switching to wood and to natural gas.

Much of the fuel oil used by the utilities and industry could be replaced by a combination of coal and nuclear power, but only slowly. By far the quickest replacement for fuel oils is natural gas. Until about a year ago, prospects for this change were dismal. But decontrol has increased the availability of natural gas and substantial discoveries are being made in the western overthrust belt, the eatern overthrust belt, the Appalachian basin, and the Atlantic outer continental shelf, as well as by deep drilling in Oklahoma and the Gulf Coast.

Two principal factors have contributed to increased and successful drilling—higher prices for natural gas and improved geophysical methods. Higher prices have made it feasible to drill deeper, to examine volumes of sediments hitherto unexplored. Improved geophysical methods permit discovery of stratigraphic traps in complexly deformed terrains. Higher prices have been particularly effective in stimulating drilling in the deep basins of the middle South and also in the shallower sediments of the Appalachian basin. In the latter region, many thousands of holes have recently been drilled. Production per hole is small, but costs are low and the success rate is very high.

The two most exciting potentials are the overthrust belts, where improved geophysical methods have been especially helpful. The western feature extends from the vicinity of Provo, Utah, northward to the Canadian border, and possibily south to the Mexican border, with a width of the order of 50 miles. Estimates of probable reserves have been as high as 100 trillion to 200 trillion cubic feet. The higher figure would represent a doubling of U.S. reserves. The potential of the eastern overthrust belt is unknown, but substantial discoveries have been made. In consequence, major oil companies have recently leased some 10 million acres in Alabama, Tennessee, Virginia, West Virginia, and Pennsylvania.

Ultimately, this country must adapt to the use of renewable resources, but first we must manage to live with the realities of the 1980's. A combination of conservation and substitution for oil is the approach we will find it expedient to follow.—PHILIP H. ABELSON