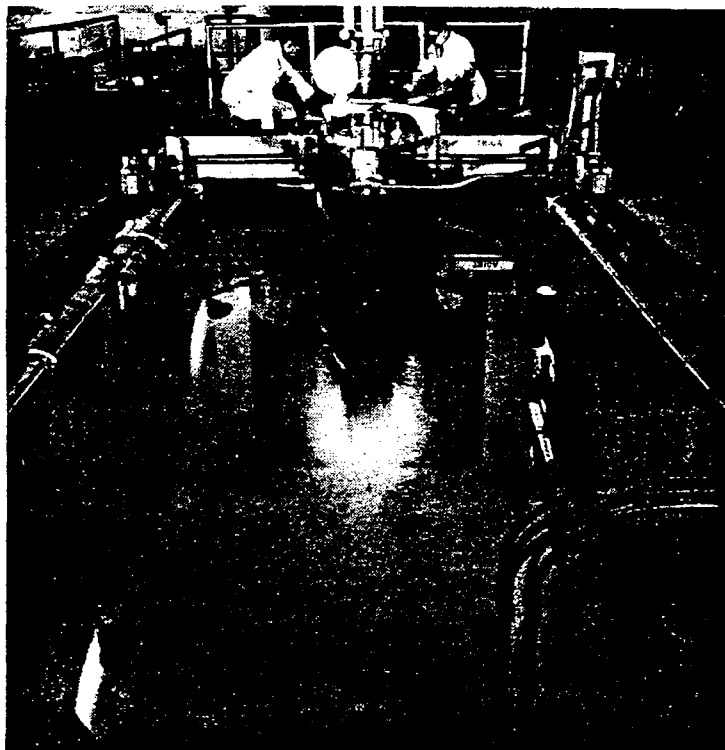


World energy needs will quadruple by the year 2000

About 40% of total energy used in the U.S. will be electric by 2000, and half of this will be nuclear



REACTOR. Mark III TRIGA reactors, such as above, are used for training. Much of new U.S. electric generating capacity is nuclear

By the year 2000 world energy needs will be at least four times what they are today—about 7.5 billion metric tons of coal equivalent. Thus they will reach about 30 billion metric tons of coal equivalent. By the end of this century half of the installed electric generating capacity in the U.S. will be nuclear, forecasts Walker L. Cisler, chairman of the board of Detroit Edison Co.

Mr. Cisler discussed world energy resources at the 2nd International Nuclear Industries Fair—Nuclex 69—held in Basel, Switzerland, earlier this month. Nuclex 69 was attended by representatives of 22 countries, including for the first time the Soviet Union.

World consumption of energy in 1966 was about 5.5 billion metric tons of coal equivalent, according to a United Nations study. The U.S. accounted for 34.3% of this total. In 1965 in the U.S. oil provided 40% of the total energy used, while gas accounted for 30%, coal 23%, hydraulic power 4%, and other sources 3%. In the Soviet Union during the same year oil provided 32.4% of the country's energy consumption, gas 13.7%, coal 36.8%, and hydraulic and nuclear power 3.2%, according to a recent West German government survey.

Discussing changes in energy sources during the past century, Mr. Cisler notes that electric power, because of its versatility, has increased about twice as fast as other energy sources. Moreover electric power serves as a market for other fuels at the same time that it competes with them. Today 20% of the primary

energy used in the U.S. is first upgraded into electric power. By the end of the century about 40% of the total energy used in the U.S. will be in the form of electric power.

Currently the U.S. has an installed electric generating capacity in utility systems and industry of about 350 million kw. By the year 2000 this will probably increase to 1.8 to 2 billion kw., Mr. Cisler told the meeting.

During 1967 and 1968 almost half of the new electric generating capacity placed on order was nuclear. Considering the growing importance of nuclear energy, Mr. Cisler forecasts that by the year 2000 half of the installed electric generating capacity in the U.S. will be nuclear.

Most of the work in nuclear energy to date has been in gas-cooled and heavy-water reactors using natural uranium, and boiling- and pressurized-water reactors using slightly enriched

uranium. Of about 90 million kw. of water reactors on order around the world, only about 5% of this planned capacity is operating.

Today the Soviet Union has a total electric power capacity of about 150 to 200 million kw., according to the West German government survey.

In 1980 the energy sources for the U.S.S.R.'s electric power capacity will probably break down this way: gas 27%, oil 35%, hydraulic and nuclear about 7%, and coal about 26%.

At a Nuclex press conference Prof. N. A. Dollezhal, member of the Soviet Academy of Sciences, stated that at present the total electric power capacity of Russia's nuclear power stations is about 1350 Mw. He gave no predictions of capacity by the end of this century.

Although both Mr. Cisler and Prof. Dollezhal see great promise in breeder reactors and the use of plutonium and uranium-233 as fuel, they point out that it is hard to forecast world energy needs by the year 2000. This will depend upon new inventions, new technological developments, and upon the emphasis given to energy intensive industries such as steel, aluminum, and titanium, Mr. Cisler says.

Finally, a good reason for favoring development of nuclear power reactors is the expected shortage of fossil fuels, Mr. Cisler told the Nuclex meeting. "When we endeavor to predict how long fossil fuel reserves will last, we appear to be talking about some 900 years at the present rate of utilization, and some 200 years at the projected rate of utilization in the year 2000," he points out.

Detroit Edison's Cisler
Fossil fuels will be short



INTERNATIONAL

Sweden has followed the U.S. lead on cyclamates, banning their use in drinks by Jan. 1, other foodstuffs by Feb. 1. Other Scandinavian countries haven't yet followed suit. The U.K. has asked for the research findings on which the Food and Drug Administration based its action. The U.K. completed its own unpublished report just a few weeks ago and found that average intake of cyclamates in the U.K. is only one fifth to one third of the allowed 15 mg. per kilogram of body weight daily. Total U.K. consumption of cyclamates is only a few per cent of the U.S. annual consumption. West German authorities have also requested the findings. At present they are cautious about making an official statement, as only about 12% of the West German populace uses synthetic sweeteners regularly. (For more on cyclamates, see page 20.)

The Soviet Union will sell natural gas to France. Under a preliminary agreement recently ratified by France's minister for economy and finances Valéry Giscard d'Estaing, France will start buying about 2.5 billion cubic meters per year of natural gas from the U.S.S.R. in 1975. In exchange for the gas, France will supply the Soviets with large-diameter pipe for pipeline. France is also reportedly interested in buying large quantities of Soviet crude oil in the early 1970's. The U.S.S.R. has been anxiously looking for West European customers for its natural gas. Presently West Germany is exploring with the Soviets the possibility of an agreement to supply, beginning in 1973, 3 billion cubic meters per year of natural gas in exchange for pipe.

British Petroleum Co. has developed a low-toxicity oil dispersant that can be used at sea or on beaches. Tradenamed BP1100, the dispersant forms an oil-in-water emulsion when used at sea. Its "toxicity to marine fauna is so low that there is little or no risk of damage to marine animal life," says BP. Dispersal of oil at sea requires about 10% of the dispersant per unit volume of oil. For cleaning beaches the proportion of dispersant is about 25%. BP isn't saying what type of compound or mixture of compounds the dispersant is. It is currently available in commercial quantities at a cost of about \$1.75 per imperial gallon.

Use of steel in U.K. autos will have passed its peak by the mid-70's, predicts U.K. auto body maker Pressed Steel Fisher. About 50% of external panels could be plastic by 1980. The company, a division of British Leyland Motor Corp., is currently working on cast polyurethane and molded acrylonitrile-butadiene-styrene (ABS) auto bodies. There's unlikely to be a rapid switch from steel, however, because of current high investment in steel fabricating plant. Pressed Steel Fisher can produce 1 million vehicle bodies annually. Bodies incorporating plastic panels for low-production models may be introduced in 1971 or 1972, but the company isn't saying which plastic and how much.

Europe is getting more polyethylene capacity. U.S.I. Europe, N.V., Belgian subsidiary of National Distillers and Chemical, will boost capacity of its low-density polyethylene plant near Antwerp to 100,000 metric tons per year. The present plant, built a year and a half ago, has been operating at above its design capacity of 47,000 metric tons. The expansion should be completed by mid-1971. Current West European capacity for low-density polyethylene is some 2 million metric tons annually.