The key to the process is standardization. In the U.S., nuclear reactors are produced by four different suppliers and designed virtually from scratch as "one-of-a-kind" ventures. At Atommash, the design is standardized in several sizes. The complex will turn out 440 megawatt (MW) and 1000 MW light water reactors, and eventually a larger, 1500 MW model.

Atommash sits in the middle of the Donets coal basin, and is fueled by a 260 MW coal-burning power plant.

In addition to the reactor, the Atommash complex will produce the steam turbine systems to generate electricity and other types of equipment. It will also utilize scrap metal from nuclear plant production for the production of consumer goods.

For the early recipients of Atommash reactors, most of whom will be Eastern European, additional generators and auxiliary equipment will come from other member-nations of the Council for Mutual Economic Assistance (CMEA) which have a nuclear industry. Under the CMEA division of labor, Czechoslovakia is producing piping systems, steam generators, and reactor mountings; Bulgaria is turning out protective devices; Hungary contributes plant maintenance equipment; and Poland will build related diesel generators.

—Marsha Freeman

CMEA resolves to expand nuclear power 15 fold by 1990

Energy policy was at the top of the agenda for the annual meeting of the heads of member nations of the Council on Mutual Economic Assistance (CMEA), which includes six European nations, Cuba, and Mongolia, held in Moscow June 26-29. Of five 10-year plans for major branches of industry, the nuclear power program was readily called the most important by Soviet Premier Aleksei Kosygin in his reports to the summit (see below). The other programs depend on it to succeed.

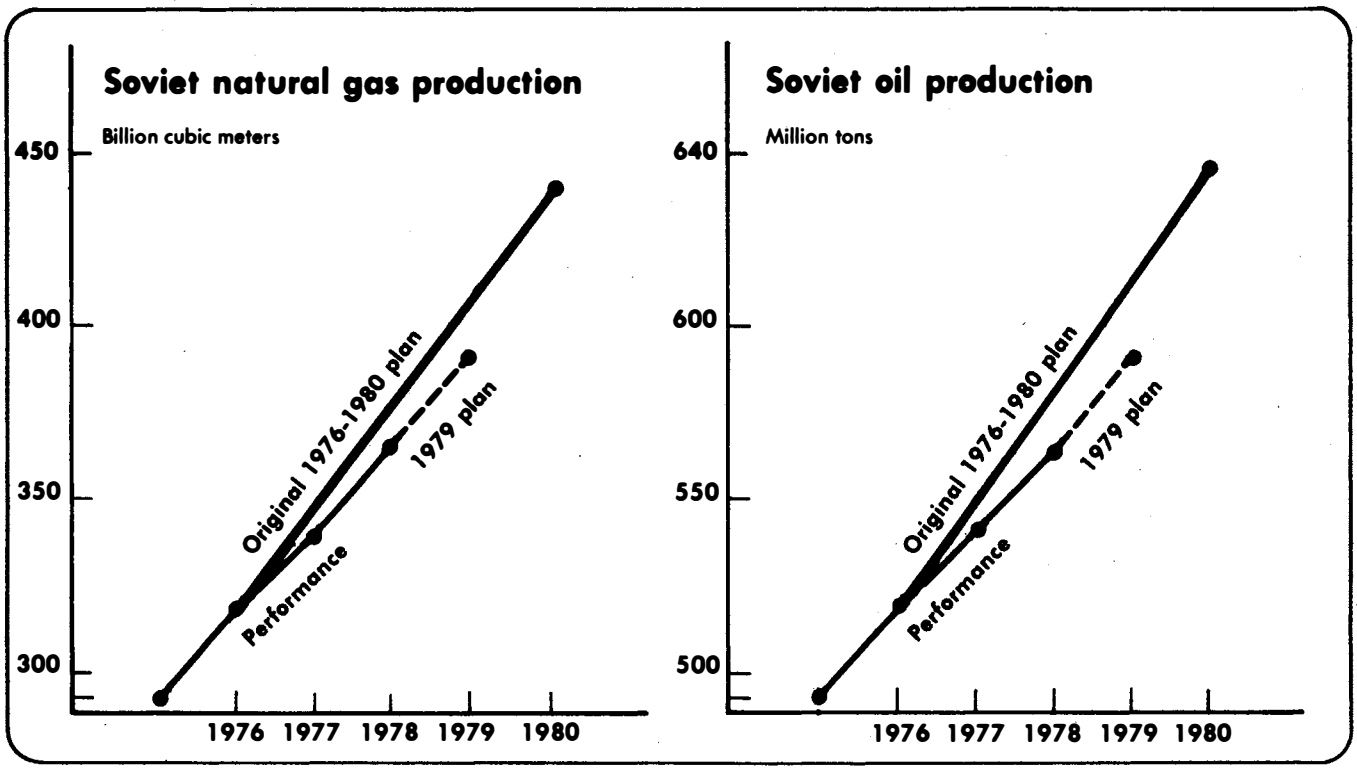
The CMEA leaders approved a plan to construct 37,000 megawatts of new atomic capacity for electric power generation between now and 1990 in the Council's non-Soviet European members and Cuba alone.

USSR energy deliveries to European CMEA nations and Cuba

	Soviet production, 1978*	Average annual Soviet shipments to CMEA, 1976-80*	Percent of Soviet production shipped to CMEA
Oil (million tons)	572**	73	12.7
Natural gas (billion cubic meters)	372	18	4.8
Electricity (billion kilowatt-hours)	1202	13	1.1
Total (million ton-equivalents)	1800	163	9.0

*The average annual shipment is derived from current CMEA projections of the total USSR deliveries in the current five-year period (1976-1980); Soviet production for the middle year, 1978, is as reported by the USSR's Central Bureau of Statistics, except for the "total" figure, which is projected from previous years' reported ton-equivalents total and the known growth rates in the main branches of the energy industry.

**Equivalent to over 11 million barrels a day.



An additional 8,000 MW divided between two gigantic complexes in the Ukraine will supply half their power to the nations of Eastern Europe (and, potentially, interested Western Europeans) who have helped to build those plants.

The magnitude of the 37,000 MW increment can be gauged by several comparisons.

* The total nuclear power plant capacity of the CMEA members including the U.S.S.R. is now 10,340 MW. The 37,000 MW expansion, *not counting the U.S.S.R.*, will more than quadruple capacity and will expand non-Soviet CMEA capacity by a factor of 15!

* The portion of nuclear-generated power will rise sharply in each member country. In Czechoslovakia, for example, it will grow from 4 percent to 17 percent in 1985, 34 percent in 1990, and close to 70 percent at the end of the century. The U.S.S.R., whose huge nuclear industry is not counted in the 37,000 MW figure, aims to run its industry on 30 percent nuclear power by the year 2000, up from under 5 percent today. CMEA Secretary Nikolai Faddeev put the overall goal for CMEA members outside the U.S.S.R. at between 15 and 20 percent nuclear power in 1990.

* The new atomic capacity is equivalent to one-third of the total present capacity for electricity generation in those CMEA countries.

* By 1990, the newly created power from nuclear plants will replace approximately 75 million ton-equivalents of fossil fuel which the Soviet Union now exports to the other CMEA members, or 45 percent of today's level of total Soviet energy deliveries to them.

Oil situation tight

The Soviet Union produces over 11 million barrels a day of crude oil, more than Saudi Arabia, but is faced with a tight fuel supply situation in industry. There are both short term and long term explanations of the problem.

One-quarter of the Soviet crude oil extracted is exported and one-half of that is shipped to CMEA members. After years of supplying Eastern Europe at fixed prices, the Soviets now charge a price based on a five-year average of world oil prices, or an estimated 40 percent below OPEC prices at the present time. For deliveries above planned amounts, the Eastern Europeans have to pay the hard currency and world prices the Soviets charge their other buyers.

West German Chancellor Schmidt observed recently that without the burden of supplying Eastern Europe, the U.S.S.R. would be fairly well-situated to cope with its own power supplies.

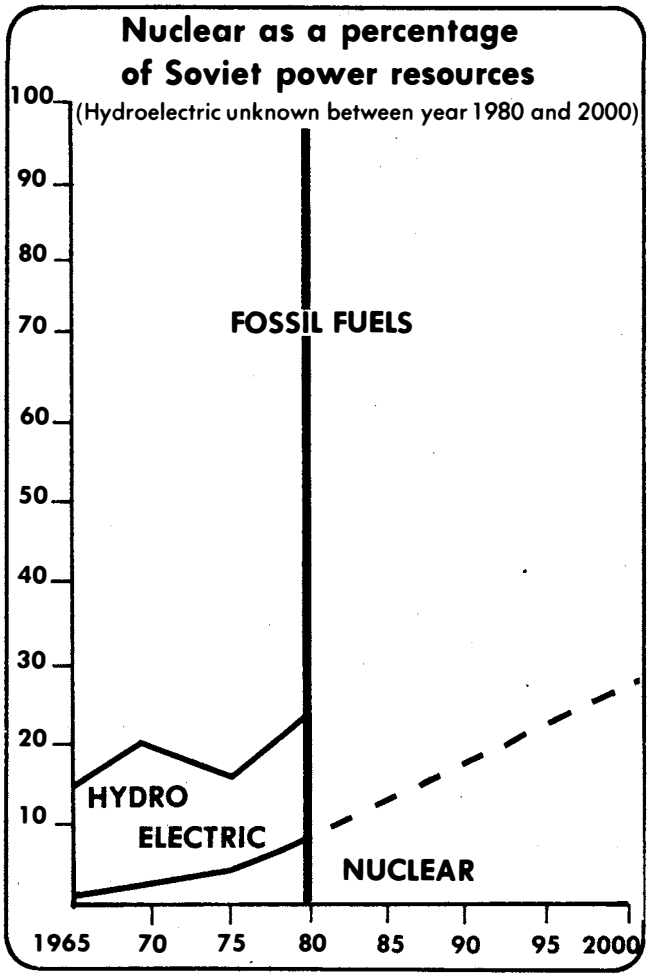
The immediate situation this year has been aggravated by two disruptive factors: an extremely harsh

winter in Eastern Europe and the shutdown of natural gas pipelines from Iran into the southern U.S.S.R. The weather was so cold that in East Germany mines were shut down when water froze in the shafts and compacted the brown coal deposits and, in Czechoslovakia, factories and offices were operated as little as two hours in a 24-hour period in order to conserve heating fuel. This pulled "bare necessity" Soviet supplies upward.

The terminated Iranian gas deliveries were one leg of a triangular trade arrangement among Iran, the U.S.S.R. and several countries in Eastern and Western Europe. The Soviets have apparently resolved to try and meet commitments to users of Soviet natural gas in Europe, quantities of gas which were balanced off in the Soviet economy by Iranian gas received through the IGAT I pipeline. (Construction of the IGAT II pipeline, which was to send the U.S.S.R. still more natural gas while the Soviets delivered to Western Europe, has been at least postponed and probably canceled by the Ayatollah Khomeini regime in Iran.)

As a result, the Soviet republics of Georgia, Azerbaijan and Armenia in the Transcaucasus region were shortchanged last winter. Strict conservation was instituted in major cities such as Yerevan, Armenia, and a large-scale conversion of industry to lower grade fossil fuels is under way.

The long-term problems for Soviet fuel development stem from the increasing costs of fossil fuel extraction, as the concentration of deposits moves north and east into Siberia. There has been less investment of Western capital into Siberia development than Moscow was counting on and, together with shortfalls in other key sectors of the economy including steel, oil production has fallen well off the pace set for the Five Year Plan period now in progress, 1976-1980. Natural gas production, however, is close to the target.



An urgent resolution

On June 13, the Central Committee of the Soviet Communist Party and the Soviet government issued a joint resolution, the strongest of policy directives. It was entitled, "On Ensuring Fuel, Electric and Heat Energy for the National Economy and the Population in the Fall-Winter Period of 1979-80."

Threatening "strict calling to account of people responsible for the uneconomical use of fuel and energy resources," the Soviet leadership put the country on a mobilization for energy production and economizing. In addition to directing comprehensive organization measures in the energy production and transport sectors to provide every city and factory with "reserve supplies of every type of fuel" in order to ensure "uninterrupted supply of the population" with fuel, the resolution specified above-plan targets in several areas, evidently designed to make up for oil shortages. In the first quarter of this year, oil production failed to meet the already downwardly revised target rate.

For home heating, the Soviets will increase the role of local resources, including peat, especially outside the major cities. The Ministry of the Coal Industry has to produce 1 million tons of coal above plan (which is 752 million tons for the year) from July through December, and the Gas Industry will supply 1 billion extra cubic meters of natural gas.

The nuclear solution

The Soviets see nuclear power as the way to solve the fossil fuel bottlenecks over the decades ahead, preparing for the day—placed 50 years from now by Academy of Sciences President A.P. Aleksandrov—when these resources are exhausted. In the U.S.S.R., while Siberian fuels will be shipped back toward Moscow as well as eastward for export (and supply huge new industrial

centers in Siberia), the entire net growth of electricity production in the European part
most industry is located, will be on account of nuclear power.

The CMEA nuclear program is an undertaking of all the member countries, as our report on the assembly line Atommash plant shows. A training center for 350 nuclear plant engineers and operators has been established at the Soviet power station in Novovoronezh. Today Eastern Europeans are in training there. Soon, they will be joined by technicians from the developing sector countries which order Atommash plants.

Finland, the Soviets' first nuclear customer outside the CMEA, is reportedly interested in helping to market worldwide the Soviet technologies exemplified in their 420 MW plant at Loviisa.

—Rachel Douglas

Soviet Premier Kosygin: 'atomic

Soviet Prime Minister Aleksei Kosygin chaired the June 26-29 summit meeting of the Council on Mutual Economic Assistance. We excerpt two of his addresses in order to highlight the Soviet conception of high-technology industry in general, and nuclear power in particular, as the cornerstone on which healthy, growing economies are built.

Opening address, June 26: The activity of our organization is always subordinated to the solution of the basic tasks of socialist and communist construction in each country and economic and social progress of the entire community as a whole.

Our cooperation has laid the basis of a new, socialist international division of labor. It is characterized by relations of equality and mutual assistance, rather than subjugation and exploitation. It develops on the basis of the national economic plans of all our countries, helping movement forward toward long-term goals posed by the fraternal parties....