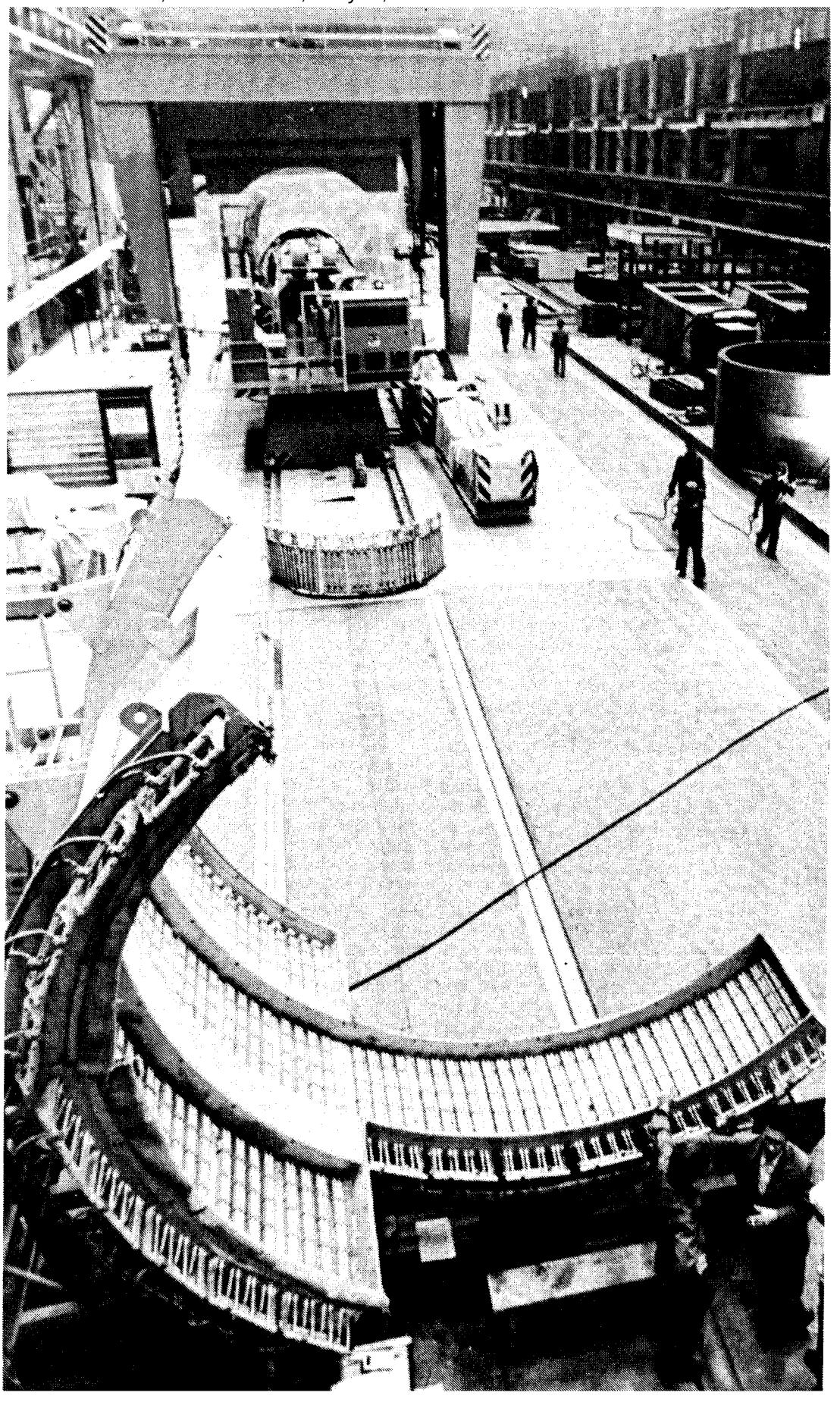
Some officials are concerned that energy problems could reinforce possible Soviet efforts to achieve military dominance in the Middle East and the Persian Gulf. Although most experts doubted that Soviet needs would lead to the seizure of oil fields in Iran or elsewhere in the region, some national security aides asserted that . . . this possibility could not be ruled out . . . 'The message was pretty ominous,' a senior staff aide on the [Senate Foreign Relations] committee said. 'We were told [by experts from the CIA, Pentagon and Department of Energy] that the Russian bear has had an appetite and that that appetite could drive him south.

—Richard Burt,
The New York Times
April 15, 1980

Concentration on Soviet expansion designs in the Middle East has blinded the United States to a development of greater significance because it is already a fact: the enormous strategic advantage that an energy-abundant Soviet Union has over an acutely energy vulnerable West.

—Jonathan Stern
Conant & Associates (London)
in The Washington Quarterly
Spring 1980



The giant Atommash facility at Volgodonsk.

Photo: Tass from Sovfoto

EIR Special Report

The rise of Soviet power: Siberia's energy frontiers

by Rachel Douglas

A great deal of incompetent strategic thinking hinges on evaluations of the Soviet Union's energy strength. Is Moscow flagging, about to run out of oil? Or is the "energy-abundant" U.S.S.R. going to manipulate the energy appetite of a collapsing Western economy?

Buried under the edifice of scenarios constructed on one projected rate of Russian oil extraction or another, is the reality described recently by French Foreign Minister Jean François Poncet, when he said that the United States is a weak superpower looking at a strong superpower, the Soviet Union. British and American policymaking elites, deep-seated Malthusians, can barely comprehend the motives of a Soviet elite that has recently redoubled its dedication to economic development.

The Soviet energy program for the rest of this century comprehends far more than the categories of "energy-rich" or "oil-hungry." It is a clue to Soviet strategic thinking about the development of the U.S.S.R. and its role in the world, which is poorly understood even by those who recognize the concrete evidence of Soviet advances in one field of endeavor or another.

Anchored by a huge nuclear power expansion plan, energy policy is the core of the domestic policy of a nation which, despite serious economic difficulties to contend with, maintains a national commitment to industrial growth and development at the frontiers of science and technology.

The civilization of the Siberian frontier, with its enormous energy resources, is central to Soviet policy. We will report here how the scientific and political leadership nurtured in the Siberian development capital of Novosibirsk, over a 20-year period of experimentation, is moving decisively to shape the 1981-1985 development plan for the entire Soviet economy.

Geopolitics won't work

The Central Intelligence Agency's forecast of an early peaking and decline of Soviet oil production was central to National Security chief Zbigniew Brzezinski's arguments for creating the Rapid Deployment Force to dispatch to the Persian Gulf. This is the geopolitical view of the U.S.S.R.'s future: ringed by the "arc of crisis" and a hostile, American-armed People's Republic of China, squeezed by sanctions against East-West trade, forced to divert from domestic consumption to meet the needs of Eastern Europe on pain of political unrest there otherwise, Moscow will strike farther across its borders in search of oil. The United States and NATO, in turn, shall prepare to meet the Soviet threat militarily in the Persian Gulf or elsewhere.

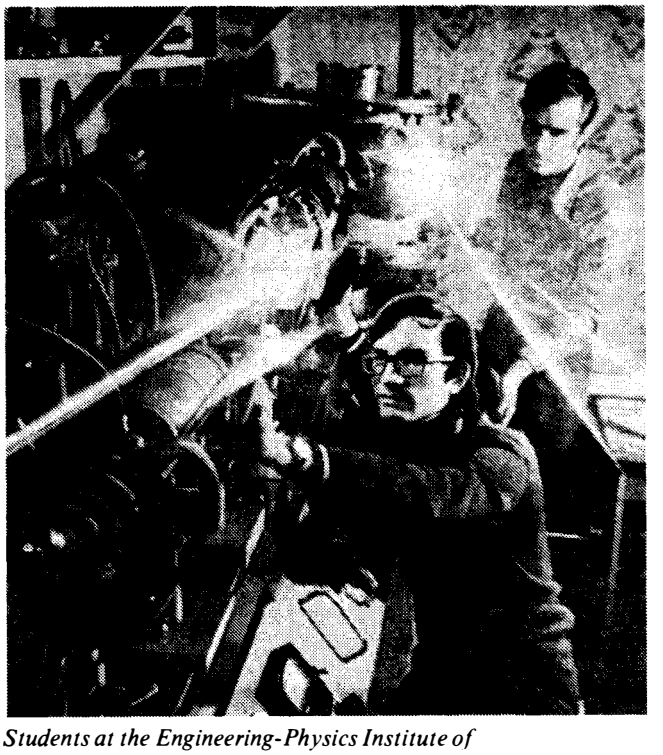
There is a dawning realization and admission, however, that the geopoliticians' calculations are upset by the decline of American power in every area: industry, energy, the military, education. In that context, the spectre of Soviet superiority in each of those areas cannot be ignored. Top policymaking circles admit that

geopolitics backed only by what James Rodney Schlesinger used to call "the aura of power" will flop.

With *Time* magazine's special issue of June 23, "Inside the U.S.S.R.," millions of Americans got a dose of this reality. *Time* featured University of Chicago professor Isaak Wirszup's report on Soviet education [*EIR*, May 27, 1980; "The education gap: Soviets leave America far behind"], which documented that Soviet high school students are graduating with a foundation in mathematics and science that is light years beyond what American schools provide. In its science article, *Time* enumerated a long list of fields in which Soviet science has surpassed American science.

What is the appropriate American policy now? There is a vocal lobby, well-connected in both the Carter and Reagan camps, for extensive conversion of civilian industry to military production in the United States.

Our report makes unmistakeably clear, however, that the strength of the Soviet economy—despite its notorious bottlenecks and areas of low productivity—is its priority on heavy industry development *in depth*. The Soviet frontier efforts, at the frontier of Siberian industry and the frontier of thermonuclear fusion research, is the basis for the military might of the U.S.S.R. A strictly military American production drive, without policies to revitalize the United States economy at its core, would be a failure.



Students at the Engineering-Physics Institute of Moscow University.

The new five-year plan

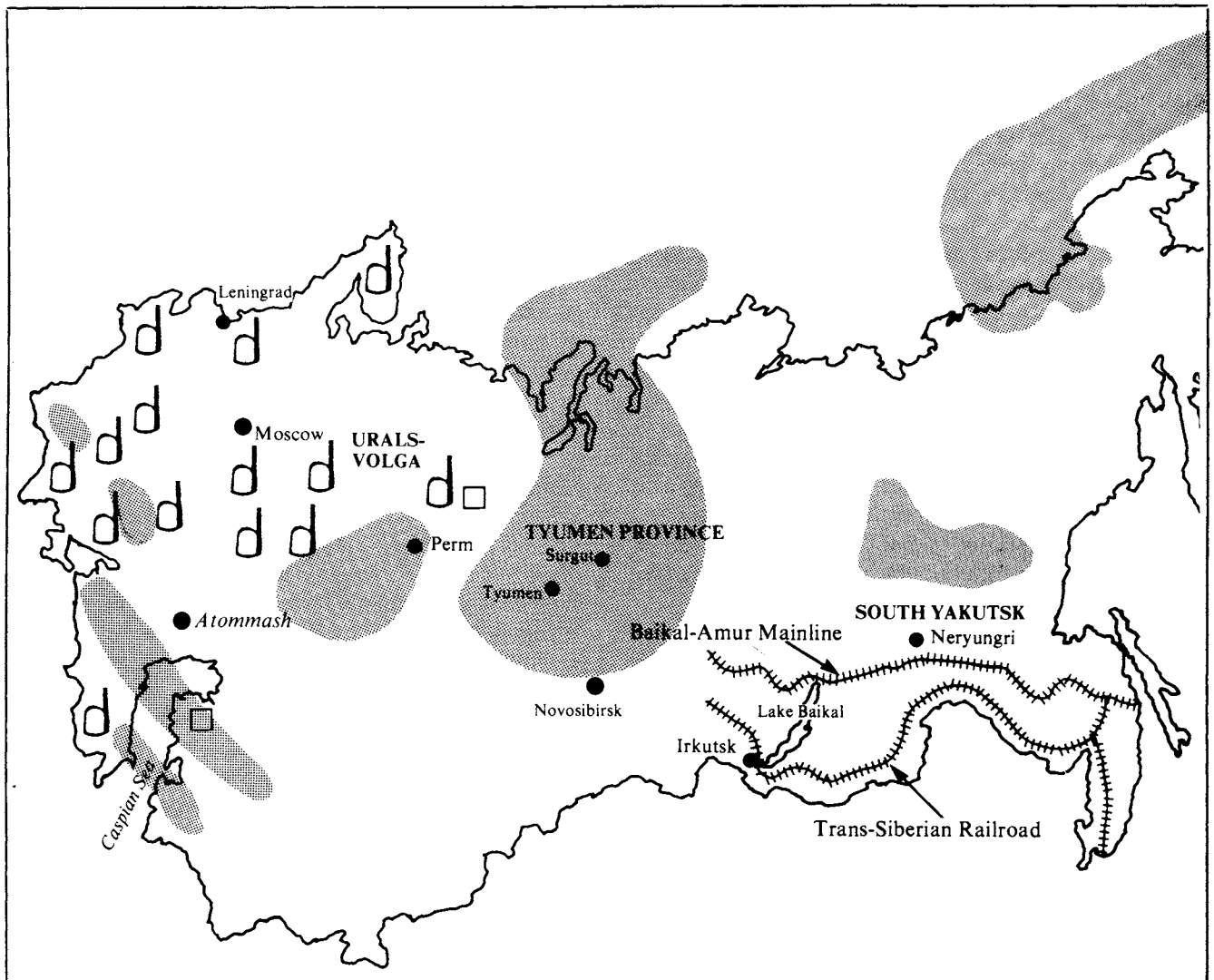
The Central Committee of the Soviet Communist Party held a conference on energy development June 2 and 3, to boost a major expansion of power production in the U.S.S.R. during the Eleventh Five-Year Plan for 1981-1985. While the detailed adjustment of targets and allocation of resources is under scrutiny in smaller meetings at the State Planning Commission (Gosplan) and at other levels of the Soviet policymaking structure, this conference and the address delivered there by Politburo member A.P. Kirilenko outlined the principles behind the plan. Kirilenko spoke chiefly about nuclear energy, technological advances in fossil fuels production, and Siberia.

Kirilenko, for years the Central Committee secretary in charge of industry and a close associate of Soviet President Leonid Brezhnev since the 1930s, concluded his speech by referring to the present international strategic situation—from the point of view of the Soviet superpower girding for possible confrontation with the United States.

"The situation in the world," he said, "dictates the necessity of successfully carrying out our plans for the development of the Soviet power industry, which plays a crucial role in the further buildup of the country's economic and defense capabilities. The Carter administration's calculations about exerting a restraining influence on our economic and power industry, through the so-called 'economic measures' it has adopted to struggle against the U.S.S.R., will come to naught."

Anyone informed about the disintegration of American high-technology research and the Carter administration's sweeping bans on nuclear power construction and development will be shocked to hear the outline Kirilenko sketched of "the power industry of the future." Side by side with measures to tackle the problems in fossil fuel extraction and delivery, the Soviet Union has placed priority on "construction of more nuclear power plants with fast breeder reactors," "developing work on controlled thermonuclear fusion power," as well as special projects for exploiting solar energy in sun-baked Central Asia and to utilize superconductivity phenomena.

In addition to convening the conference at which Kirilenko spoke, the Central Committee is issuing a series of policy resolutions on energy and other branches of industry. The Committee documents mandate



Soviet energy development

The construction of nuclear power plants in the European part of the U.S.S.R. and the Baikal-Amur Mainline in East Siberia are high points of the Soviet Eleventh Five Year Plan.

Key

- Oil deposits
- Railroad (Baikal-Amur Mainline shown as it will be after completion; only the BAM and the Eastern part of the Transiberian are shown)
- Nuclear complexes operating, under construction or planned. Plants shown may have several reactors.
- ☐ Breeder reactors

extensive housecleaning in industry to deal with inefficiencies, as part of drafting the Five-Year Plan.

The Siberians

Brezhnev initiated the shakeup at a Central Committee plenary session in November 1979, when he criticized six ministers by name.

Then in January, in a major personnel shuffle, the head of the Siberian Division of the Soviet Academy of Sciences, Academician G. Marchuk, was brought to Moscow to take over the State Committee on Science and Technology, a government coordinating body with input into all aspects of economic planning, technological development and trade. Marchuk, his successor at the academic center in Novosibirsk Academician V. Koptyug, and other leading lights of the Siberian Division, have targetted the rampant tunnel-vision in the industry-centered government ministries. Their approach has the backing of the Central Committee, as indicated by Marchuk's appointment and confirmed by Kirilenko's several warnings to industry officials.

On December 7, 1979, ten days after Brezhnev spoke to the Central Committee plenum, the party daily *Pravda* carried an article by Academician A. Aganbegyan, director of the Siberian Division's Institute for the Economics and Organization of Industrial Production and editor of its journal, *EKO*. Aganbegyan handed up a detailed indictment of the Steel Ministry, Transport Construction Ministry, and others for bungling on various Siberian projects.

To the woeful stories of lost rubles and railroads that would have saved billions had they been built, Aganbegyan counterposed several thumbnail drafts of plans that would continue Siberian development "in a professional manner." The organizational precedent he cited was a flashing red light for any Soviet citizen who remembered the mobilization to lift Russia from backwardness to the status of an industrial power: a government bureau for the Urals-Kuznetsk Combine, the greatest area development project of the First Five Year Plan in the 1930s.

Aganbegyan stated bluntly that the State Committee on Science and Technology "ought to" set up a subdivision to be responsible for a coherent program of science and technology in Siberia, whose development Brezhnev and other leaders consider crucial. With the promotion of Marchuk, Novosibirsk took responsibility for the State Committee itself.

The Siberians argue that there is a competent way to overcome bottlenecks and resource shortages in the economy, severe as they may be even in basic sectors such as steel. The method indicated is through large regional projects administered as single complexes. This approach is in practice in Siberia, where the construction of entire new cities together with associated industry, regional food complexes and other infrastructure is designed by integrated teams of scientists and planners working out of Novosibirsk.

On June 8, the same day as a Central Committee resolution reviewing problems in the metals industry appeared, Koptyug published an article in the government daily *Izvestia,* entitled "The Siberian Scope." He wrote that such basic questions of development as investment allocation "can only be solved on the scale of national economic policy . . . coming outside the framework of agency or regional interests."

Long-term plans

The enhanced role of the Siberian Division, and the entire Academy of Science in drafting the 1981-85 plan follows a planning reform resolution passed by the Central Committee and the government in the summer of 1979. For the first time, according to this document, Five-Year Plans are supposed to be subordinated to a twenty-year master plan for science and technology.

Little has been made public to date about what this relationship will look like in practice, except what is implied by stepped-up criticism of industrial ministry officials, the people who habitually resist both organizational and technological innovations if they interfere with the internal working of the ministry from an accounting standpoint. At the enterprise level, the new planning mechanism is designed to provide disincentives for resistance to new technologies. What previously passed as "plan fulfillment"—a certain tonnage target met, despite failure to answer quality and product specifications—will be penalized with a reduction of funds for wage bonuses and other local expenditures.

Simultaneous with the new plan, the system of wholesale prices is being revised for the first time since 1967. N.T. Glushkov, chairman of the State Committee on Prices, reported in an April 1980 article that the new price rates have been set for coal, oil, natural gas, and electricity, in the first round of the price revision. The precise increase for these fuels was not announced, but it is expected to be steep (wholesale prices on steel, Glushkov said, will rise 20 percent).

The goal in these shifts is not to inflate prices at the consumer level, but to correct imbalances in the economy. The petrochemicals industry, for instance, whose Minister Fyodorov was attacked by name in a June 1 Central Committee resolution, will face the increased oil prices but a 20 to 50 percent reduction in wholesale prices for most plastics and synthetics it produces. The industry will have no choice but to improve productivity and efficiency if it is to maintain profit norms.

The oil of Siberia

The problems of Soviet oil production begin with geography. The size of the U.S.S.R.'s reserves, a state secret, is the subject of speculation ranging from the CIA's figure of 30 billion barrels through a widely-believed middle estimate of 60 billion barrels, to the analysis of the Swedish firm Petrostudies, according to which Soviet reserves are close to 150 billion barrels. Soviet production last year was 11.7 million barrels/day.

What is not disputed is that most of this oil is in areas which are extremely difficult to exploit for reasons of geology and climate.

In the 1970's, a radical shift occurred in Soviet petroleum production, moving the industry's center from the Volga-Urals fields to the Tyumen district in Western Siberia. Tyumen is above 58° N latitude, in a heretofore undeveloped expanse of forest, lakes and swamps.

Even the 1976-1980 Five-Year Plan did not anticipate such a rapid forced growth in Tyumen as was eventually carried out. Only after the older Volga-Urals fields failed to maintain growth of output during 1976, the first year of the plan, did Tyumen rise to top priority. In effecting this shift in mid-stream the Central Committee listened to the advice of several Siberian experts who had to overcome the conservatism of top officials of the State Planning Commission, Gosplan.

The economists of Novosibirsk, especially L.P. Guzhnovskii of the Institute for the Economics and Organization of Industrial Production, argued that with the Western oil fields on the decline, it was a mistake not to commit sufficient resources to Tyumen to make it a major producer. The scientific demonstrations of Guzhnovskii and others augmented the organizational groundwork that had been laid by the dynamic head of Glavtyumeneftegaz (Main Tyumen Oil and Gas), N. Muravlenko.

The December 1977 plenum of the Central Committee resolved to mobilize resources from all over the country to build in Tyumen. Drilling brigades were uprooted from the Volga-Urals fields and flown to west Siberia. Construction began on a 2100-mile pipeline from the Ob River town of Surgut between Tyumen and oil-bearing formation still further north to Perm and across the Ural Mountains into European Russia.

The effort paid off, at least for the 1976-1980 period. Academician A.A. Trofimuk reported June 12 that Tyumen, which in 1977 was producing 40 percent of petroleum extracted in the U.S.S.R., accounted for 90 percent of its growth in the five years of the plan.

Because the Tyumen project was a crash effort, technological methods were employed to maximize output, which Soviet experts now believe reduced the total portion of oil that will be recovered from these deposits. Injection of water maintained underground pressures and the flow of oil was initiated much earlier than it had been in other Soviet oilfields.

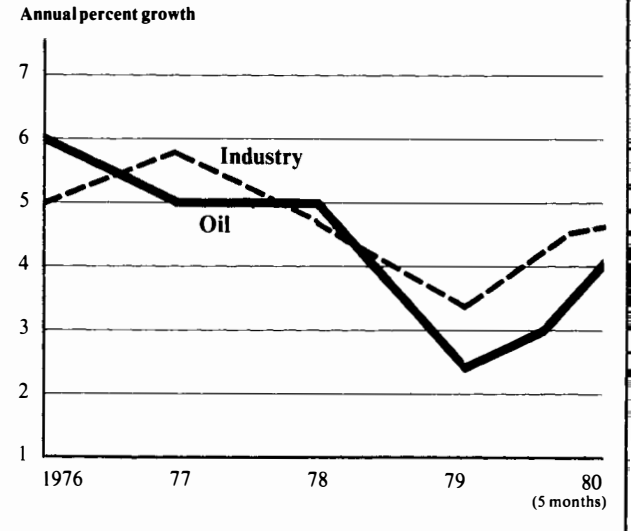
The high-pressure water breaks down structures in the oil-bearing rock, leading to a mixing of water with oil in areas removed from the point of water injection. The result is a rising ratio of water to oil in the fluid that is lifted from the well. The average water cut in Soviet oil wells reached 50 percent several years ago.

The second big problem for Tyumen and its future development is infrastructure. Wells were drilled during the past half-decade in locations unreachable by road. There is a new rail link being forged from Tyumen north through Surgut and toward the far north gas producing town of Urengoy, but all of these population centers are severely crimped by lack of housing, roads, and other services. The rough conditions contribute to a serious labor turnover problem.

A second Tyumen?

In March, I. Nesterov of the Western Siberia Scientific Research Institute for Geological Oil Prospecting wrote in the weekly *Ekonomicheskaya Gazeta* that there

Rate of growth of oil and industrial production in the U.S.S.R.



The rate of growth of oil extraction in the Soviet Union has declined during the last half decade, but so has the rate of growth of industrial production overall.

is evidence of "a second Tyumen . . . in Tyumen." The oil is there, that is, if the oil industry can exploit it. Other Soviet geologists assert that, "The current rate of increase in oil extraction rates can be not only maintained for a long period, but even markedly increased," according to a Soviet news daily.

In April, the Central Committee revealed that another all-out mobilization for Tyumen was about to begin. Oil industry, planning and construction officials met under the direction of Central Committee Secretary for heavy industry V.I. Dolgikh, to review "the intensification of capital construction in the region of the west Siberian oil and gas complex." The conference resolved to tackle the urgent problems of housing and roads, recruiting construction workers from organizations as far away as Leningrad to do the job.

Mikhail Solomentsev, the Prime Minister of the Russian Federative Republic in which Tyumen lies, wrote May 6, "The volumes of all operations (in west Siberia) must be doubled or tripled."

A Siberian proposal for industry reform

The growth rate of Soviet oil extraction declined in 1979—in the context of slowed overall industrial growth, but more steeply than the average for all industries. In the first four months of 1980, it has staged a modest recovery to 3 percent growth.

Coming on the heels of the 1979 shortfall, a statement by Academician A.P. Krylov of the Institute of the Economics and Organization of Industrial Production in Novosibirsk was widely quoted in the Western press as Soviet admission that the CIA forecast of early peaking were correct. "If . . . the present rate of increase in the index of depletion (is) maintained, Soviet petroleum production will reach a maximum level in a relatively short time, after which it will start to fall off."

Articles in *Time* magazine and the *Baltimore Sun* ignored the rest of Krylov's paragraph: "There are two ways to avert this peaking and subsequent decline: The first is to step up the rate at which new wells are drilled [which would entail higher capital investments and more pipe], and the second is to shift to technologically and economically sound systems of exploitation that would entail lowering the density of wells per deposit and reducing the index of depletion* [which would not require additional capital investments]."

Krylov prefers the latter course, but he admits that

* Ratio of total well yield to size of current reserves.

Novosibirsk and the development of Soviet Science

The Siberian Division of the U.S.S.R. Academy of Sciences, based in the special suburb of Akademgorodok outside the West Siberian city of Novosibirsk, is the brain center of the biggest development project in the world, the Siberian frontier. Since its establishment in 1959, Novosibirsk has combined a leading role in advanced R&D such as the work of its laboratories on controlled thermonuclear fusion power, with a broad agenda of special projects for Siberian application: cold-weather machinery development, hybridization of food plants for rare weather conditions, mineral resource mapping and many others.

Novosibirsk and its leadership are the best the Soviet Union has.

For Americans, who face the U.S.S.R. as an adversary, thanks chiefly to Washington administration policies that have led inexorably toward confrontation, the "best" of the Soviet Union means two things. First, the "Siberian" approach to basic research, R&D, defense spending, and manpower has made the U.S.S.R. the world's premier military power, while United States strength has eroded during the past decade and a half by a combination of incompetence and economic collapse.

But second, the development of Siberia is the closest thing to the American System of economic development to be found in Russia. It is a program of building entire new cities around giant hydroelectric power stations on the Angara River in southern Siberia, laying thousands of miles of railroad track across swampy and frozen wilderness to construct the Baikal-Amur Mainline to carry out Siberian minerals, and extracting oil from beneath permanently frozen ground. Given American policies not shaped by the game of geopolitical confrontation with the U.S.S.R., this Soviet commitment to conquering the Siberian frontier would define the greatest commonality of outlook and interest between the two nations.

The Siberian tradition. The rise of Novosibirsk began in 1957, the same year the Russian Sputnik shot startled the world. Together with a group of colleagues, its founder Academician Mikhail Lavrentiev proposed to establish a scientific center to guide the exploitation of Siberia. Science and industry would grow in tandem.

The conceptual history of Novosibirsk can be traced much farther back in history. The great philosopher, scientist and statesman G.W.F. Leibniz, who drafted for Peter the Great the plan for the St. Petersburg Academy of Sciences (the direct forerunner of the U.S.S.R. Academy), proposed to develop the wastes of Siberia for their own sake and as a route to open commerce with China.

Leibniz's project remained a goal of Russia's pro-industry factions in subsequent generations. Although the Siberian frontier was not cracked until the Soviet period, a tradition of science took root there in the nineteenth century, beginning with those of the exiled Decembrist rebels (1825) who were adherents of the American System of economic development. The family of Russia's great chemist and political economist D.I. Mendeleev was from Siberia.

A large undertaking, a central authority, and spinoff effects that transform sectors of the economy thousands of miles apart all over the country. What the Russians have in Novosibirsk, America last knew in the NASA program.

Territorial projects. The Siberian Division of the Academy runs pilot projects for new technologies in the Novosibirsk area and its tens of factories. For full-scale industrial development, the Academy and its constituent institutes (Mathematics, Automation, Economics and Organization of Industrial Production, Geology and others) contribute to the planning and construction of what are called Territorial Production Complexes (TPC's) in Siberia.

A TPC includes several related plants or mines together with the infrastructure necessary to build and service them. Along the Baikal-Amur Mainline, there will be several TPC's, some extending vertically from the original Transsiberian Railroad 100 miles south of the BAM and some built from scratch next to the new railroad. Near one of them, at Neryungri in Eastern Siberia's South Yakutsk area, the Soviets have recently discovered an iron ore deposit of at least two billion tons which will be the basis for a steel industry in the Far East.

The Siberian Division studies and solves technological problems, with results being communicated to the regional project managers through their ministries. It also advises the planning process from the word go, both through the State Committee on Science and Technology (now headed by the former chief of Novosibirsk, Academician G.A. Marchuk) and in direct reports to the State Planning Commission, Gosplan.

A national conference opened on June 10 in Novosibirsk, dedicated to the "further development of (Siberia's) economic potential and raising its role in national production," according to the Soviet news agency TASS. Marchuk delivered a keynote on the Western Siberian oil industry and plans for the BAM area. Among other speakers were Academicians A.G. Aganbegyan, director of the Siberian Division's Institute of the Economics and Organization of Industrial Production; and A.A. Trofimuk of its Geology and Geophysics Institute; head of the Gosplan's economic research institute V.P. Mozhin, and other contributors to the long-range program known as "Sibir."

"Sibir" is a complex development plan for exploitation of Siberian resources, which the mathematical economists of the Siberian Division have computerized to test for optimal investment schedules. The "Sibir" program is being used to shape the Siberian portion of the Eleventh Five-Year Plan, and its national priority was underscored by the participation in the Novosibirsk conference of Academy President A.P. Aleksandrov and Central Committee Secretary Mikhail Zimyanin.

The Siberian expertise in regional development does not at all mean that the economists of Novosibirsk are advocates of decentralization of the Soviet economy. On the contrary, the type of reform they strongly lobby for involves the creation of tightly centralized organizations to handle services or aspects of production which create inefficiencies when decentralized to the individual regional organizations of the industrial ministries.

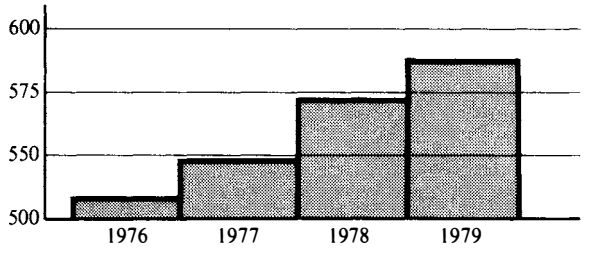
Academician Aganbegyan called in a January 1980 article for establishing a ministry or national department of centralized interindustry products—tools, forgings, measuring instruments and certain semifinished products. To do this, he predicted, could reduce by two or three times the auxiliary outlays by local industry organizations for current costs and capital. The entire Soviet highway system is also too decentralized, equipped with 2 to 5 truck garages where loading is done by hand, and so is the logging industry, argued Aganbegyan.

Novosibirsk energy economist A.P. Krylov makes a similar point for the case of oil industry drilling (see accompanying article).

Especially in energy policy, the role of the Siberians and of those economists and managers elsewhere in the U.S.S.R. who are "Siberian" in outlook has often been to convince Moscow planners to take risks and invest in areas where a truck has never been before, much less a power plant or a city.

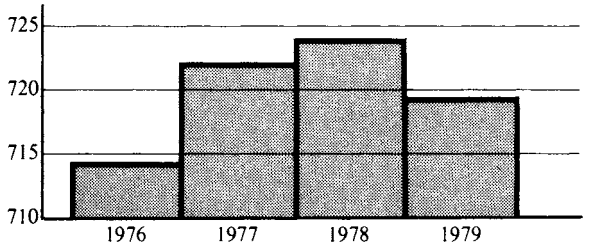
Soviet energy production 1976-79

Oil production
Million tons*

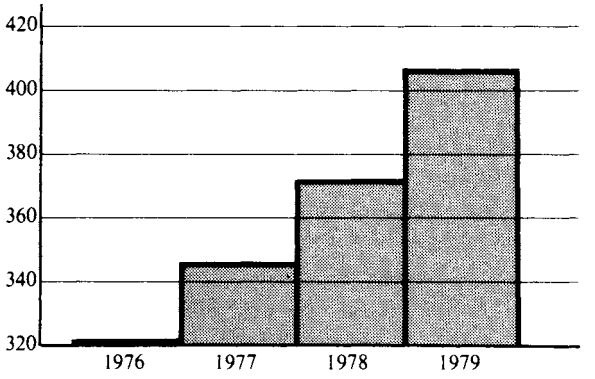


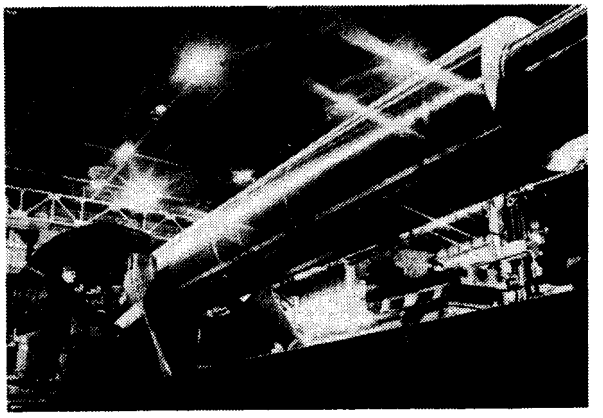
* Multiply by .02 for barrels/day

Coal production
Million tons



Natural gas production
Billion cubic meters





The turning of the shaft of a turbo generator

taking it would require overcoming managers' resistance to abandoning the "quick fix" rapid exploitation method of drilling closely spaced wells in known deposits; reduction of indiscriminate use of water-flooding; and improved rates of exploration to increase proven reserves.

The Siberian academician also proposes to disrupt the vertical organization of the oil industry, under which each regional oil organization has to acquire "all the services necessary for an extractive enterprise," so that—in the case of drilling equipment—"by the time an association's drilling capacity is fully developed, the need for drilling is about to decline sharply and providing the association with sufficient work becomes a problem." Krylov proposes to take drilling out of the hands of these organizations and centralize it with special drilling associations deployable from one field to another. The result would be "optimal volumes of exploratory and drilling work . . . maintaining relatively stable work volumes."

The resistance which Krylov's proposal will encounter from parochial-minded middle-level managers in the oil industry will be intense. There is a related problem for oil drilling in general, namely the continuing practice of measuring drilling success in meters drilled, whether the hole comes up dry or yields oil. Like the measurement of steel output in tons, this criterion is supposed to be changed during the 1981-1986 Plan.

Krylov's program, in suggesting a move away fom water-flooding, also implies that the U.S.S.R. needs to employ tertiary recovery technolgoies which Soviet industry does not produce in quantity or quality. This is a case of the marginally important input of East-West trade, and in the 1970s, the Soviet Union had already bought two and a half billion dollars of oil and gas equipment, other than pipelines, in a single year.

The Soviets seek Western technology for drilling and for offshore development, which in the Caspian Sea is striking out into deep waters for the first time. Although the Soviets impressed attendees at a Tulsa, Oklahoma oil exhibition last fall with the machine that drilled "the deepest hole in the world" (over 31,000 feet), they admit that it would be impossible for the U.S.S.R. to manufacture enough high-technology equipment itself to handle all their development plans. Western sanctions on petroleum industry equipment could slow, but not halt, the growth of the Soviet industry.

Any predictions of Soviet energy weakness that are based on the oil picture alone, however, are flawed from the start. Natural gas production in the U.S.S.R. has surpassed every plan target for the last five years. Siberia contains enormous reserves of coal. And fossil fuels will be steadily yielding ground to nuclear power in the Soviet energy balance.

The nuclear program

As the American nuclear industry is grinding to a halt, the Soviet Union is planning to commission 10 nuclear reactors a year starting now. From its current modest level of approximately 12,000 MW electrical generating capacity, scarcely more than 5 percent of national capacity, the U.S.S.R. nuclear power sector is slated to supply 30 percent of power by the year 2000.

Some Soviet energy planners are thinking of an even swifter acceleration of nuclear power production. Academician A.P. Aleksandrov, for example, told a press conference last December that the portion of atomic-generated electric power in the Soviet economy would be 25 percent in 1990.

The distribution of nuclear construction is critical. In the European part of the U.S.S.R., the area of densest population and concentration of industry, the entire net growth in energy consumption is going to be provided by nuclear power, starting in the next Five Year Plan.

Many of the new reactors will be built at Atommash, the world's first facility for serial production of nuclear reactors. The huge plant at Volgodonsk has begun to construct its first nuclear reactor, six months ahead of schedule. Within several years, Atommash will be turning out three sizes of reactor: 440 MWe, 1000 MWe and 1500 MWe.

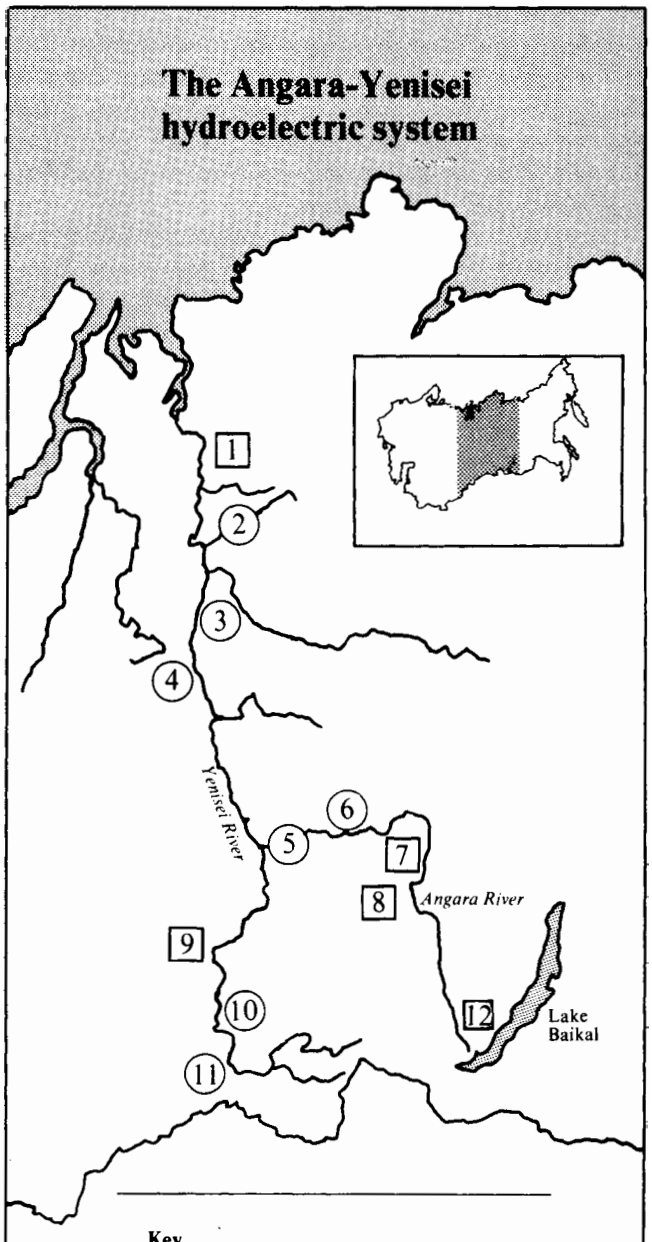
Atommash is intended to produce for export as well as fill domestic orders. It was sited on the canal that connects two great rivers of Russia, the Volga and the Don, at their point of nearest approach. The reactors can be floated by barge to their destinations via the U.S.S.R.'s vast system of inland waterways.

Fast breeder and fusion power

On April 8, the Soviet news agency *TASS* reported that a 600 MW nuclear fast breeder reactor had begun commercial operation at the Beloyarsk power station in the Ural Mountains. The BN-600 reactor is the largest breeder reactor in the world and the first commercial-scale use of fast breeder technology.

A smaller fast breeder reactor, at 150 MWe capacity, has been in use for water desalination at the Shevchenko power plant on the Caspian Sea, in a demonstration project.

A decade ago, when the fast breeder programs of the United States, the Soviet Union, France and England were all at the demonstration reactor stage, America had the lead. Since then, however, the Carter administration's blocking of funds for the Clinch River



The Angara-Yenisei hydroelectric system

Key

- □ hydroelectric plants
- ○ hydroelectric plants under construction

1 Ust-Khantaisk	7 Ust-Ilimsk
2 Kureisk	8 Bratsk
3 Tungussk	9 Krasnoyarsk
4 Osinovsk	10 Mainsk
5 Middle Yenisei	11 Sayano-Shushensk
6 Beguchansk	12 Irkutsk

There are 5 operating hydroelectric stations on the Angara-Yenisei river system, and 7 planned or under construction located in south central Siberia to the west and north of Lake Baikal.

Breeder Reactor and banning of the commercial nuclear fuel reprocessing plant in Barnwell, S.C., have deprived the United States of this nuclear technology, which produces more fuel than it consumes. The United States has now fallen far behind the Soviet Union. In the West, it has fallen far behind France.

Writing in the February issue of the popular Soviet science magazine *Priroda* (Nature), State Atomic Energy Committee scientist Oleg Kazachkovskii explained that the breeder would be a big contributor to the Soviet energy effort. In this article, Kazachkovskii also pointed out that Soviet scientists and energy planners strongly believe that burning fossil fuels to generate electricity is a serious misallocation of resources that nuclear energy has to help put an end to. Scientists have known for at least 100 years, he wrote, that the most efficient use of the energy potential in fossil fuels is as raw materials for the chemicals industry, not combustion.

The Soviets, who also have a project for fission-fusion hybrid technology, consider their present nuclear plants and the breeder transitional to an economy based on controlled thermonuclear fusion power. Their leadership in fusion research, which aims to harness on earth the reaction which powers the sun, is world-recognized—and is inextricable from the breakthroughs they have made in weapons technology, including much-discussed advances in ABM capabilities based on electron-beam technology.

Official publications refer to fusion power as the energy source of the 21st century, but Soviet scientists have said that demonstration and even commercial application of a working fusion power plant could come within the next decade and a half. This is one of the areas in which the U.S.S.R. has formally called for international efforts to be pooled.

Hydroelectric power

The idea of capturing the energy of the huge Siberian rivers was included in the GOELRO electrification plan of the 1920s. The Lena, the Ob and the Yenisei rivers are three of the 15 longest rivers in the world. The Angara, a tributary of the Yenisei and itself the 46th longest river in the world, is one of the strongest of all Siberian rivers.

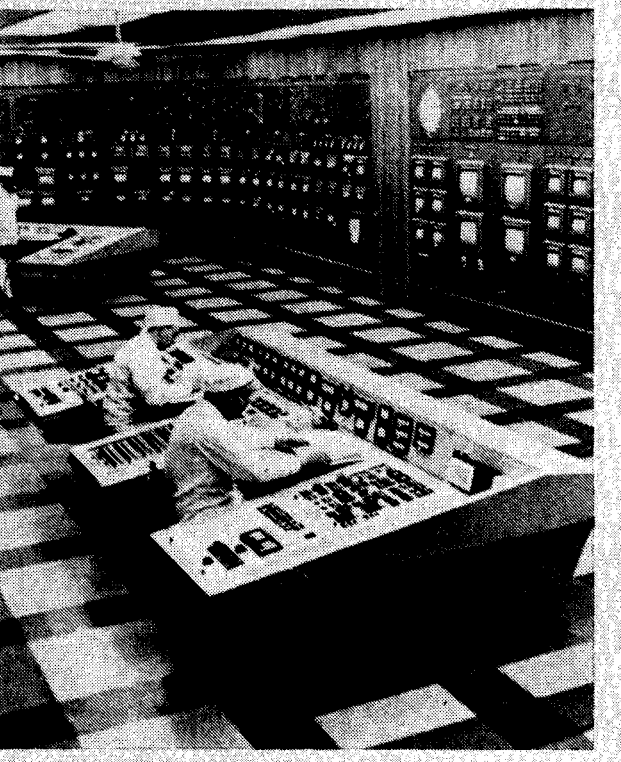
Today, dams on those rivers as well as on the Dniepr and other European Russian arteries provide approximately seven percent of the Soviet Union's total electrical generating capacity of 240 thousand megawatts. The map of hydroelectric stations under construction on just one of the Siberian river systems, the Angara-Yenisei, shows the scope of planned development of this cheap source of energy.

World energy solutions

Politburo member Kirilenko made his point about emerging unscathed from the Carter administration's sanctions with great emphasis when he addressed the Central Committee energy conference June 2. The theme of gearing up in the face of adversity running through Kirilenko's statement typifies Soviet thinking on the interlock between their economy and the international strategic situation. The Russians are not, however, dead set on autarkical development and an end to East-West trade.

The contrary was evident during the joint Soviet-West German economic commission meeting held in

The great atommash



The control room at a Soviet nuclear installation.

Bonn this past May, after which the Soviet delegate to the talks, Politburo member N. Tikhonov, spoke of the complementarity of the Soviet Five Year Plan and the conjunctural position of the West German economy. Progress was made in talks on new deals for the trade of West German wide-diameter pipeline and Soviet natural gas, some of it from Western Siberia, which will be transported in that pipeline.

The European governments, unlike Washington, are continuing to encourage development of the Soviet export market.

There are other, more profound considerations in Soviet international energy policy. The most advanced thinkers in the U.S.S.R. fear, rather than welcome, the collapse of the American economy and talk about the necessity of American energy development as a vital concern.

Academician Mikhail Styrikovich, writing in the November 1979 issue of the Novosibirsk magazine *EKO*, presented a mature view of "The Energy Situation in the World." Speaking not of Soviet, but of "world" energy needs, Styrikovich wrote that the breeder reactor and fusion power were the only long-term solutions. Without nuclear energy, we will face either "a reduction in the rate of growth of world power engineering" or—for less energy-dense technologies—investment requirements "higher than the world economy can sustain."

For this Soviet scientist, the slowdown and suspension of breeder programs in Western countries is cause for "alarm."

In a July 4, 1979 interview to the *Washington Star*, President of the U.S.S.R. Academy of Sciences A.P. Aleksandrov said that the alternative to *international* nuclear power development was war. "We must . . . build nuclear power reactors in all parts of the world," he said, "otherwise wars will one day be fought over the remnants of oil and gas deposits. And there will be wars . . . between the capitalist countries, because the Soviet Union will have concentrated on the production of nuclear power and be ahead of everybody else."

There are 16,000 people living in a new town on the banks of the Volgodonsk Canal, which connects the two great rivers of European Russia, the Don and the Volga, where they flow near each other in the south of the country. Most of them are workers and families of workers employed in a single complex of factories that has risen together with the town during the 1970s.

The complex, named Atommash for "atomic machinery," is the world's first plant with an assembly line for nuclear power reactors.

Atommash is the most modern example of a Soviet integrated industrial complex, utilizing and updating the mass production techniques invented at the beginning of this century by Henry Ford and perfected by other American manufacturers. When the U.S.S.R. embarked on its first Five Year Plan in 1929, when the world economy was in the grips of the Great Depression, they turned to the United States. A team of Ford engineers, out of work in Detroit, traveled to Russia to design and help to build the Soviet Union's first mass production plant, the Stalingrad tractor factory.

Today it is the Soviets who have carried into the nuclear age the American principle of continually looking for more highly automated, labor-saving industrial technology. There is no American Atommash. Westinghouse developed a sophisticated technology for the production of floating nuclear reactors, but their Florida plant is idle. Its first two orders, from Public Service Electric & Gas in New Jersey, were cancelled due to the slow growth policies of Gov. Byrne's administration.

While in the United States nuclear reactors are produced by four different suppliers and designed virtually from scratch as "one-of-a-kind" ventures, Atommash will standardize reactor design in three sizes: 440 megawatts (MW), 1000 MW, and eventually 1500 MW.

The Atommash complex will also produce the steam turbine systems to generate electricity, and other types of equipment. It will 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 countries, additional generators and auxiliary equipment will come from other member-nations of the Council for Mutual Economic Assistance (CMEA) which have a nuclear industry. Czechoslovakia is producing piping systems, steam generators, and reactor mountings; Bulgaria is turning out protective devices; Hungary contributes plant maintenance equipment, and Poland related diesel generators.

The Atommash plant itself, which sits in the middle of the Donets coal basin, is fueld by a 260 MW coal-burning power plant.

Reprinted from EIR, Vol. VI, No. 28, July 17, 1979.

Kirilenko's future for energy

Speaking to a June 2-3 Central Committee meeting on energy, Politburo member A.P. Kirilenko summarized national goals and specific programs for the Eleventh Five Year Plan, 1981-1985. Kirilenko, an associate of Leonid Brezhnev since the 1930s, is Central Committee Secretary in charge of domestic affairs, particularly industry.

Our party, from the first years that the Soviet state was created, has consistently conducted a policy of electrifying the country and ensuring a rapid development of the power industry. The beginnings of this policy were laid with the adoption of the historic GOELRO plan (Soviet Russia's national electrification and economic development plan in the 1920s), whose 60th anniversary will be marked in December 1980. . . .

Soviet people are properly proud of the achievements of our power industry. Just in the last 15 years, the country's electric power production has nearly tripled, while 165 thousand MWe new capacity were brought on line. . . .

However great these successes are, the problems of developing electric power—that most important sector of our economy—have not lost and will never lose their urgency. The party proceeds from the assumption that the further economic and social progress of the country and the rise in living standards for the Soviet people can only be ensured by a growth of energy capacity in the national economy that outstrips other growth rates.

You all know very well the deep analysis of the situation in our fuel and energy complex that . . . L.I. Brezhnev gave at the November 1979 plenum of the Central Committee of the party. . . . It is necessary, he stressed, to think through the entire complex of energy power problems, and in the 1980s to substantially improve the fuel-energy balance of the country. Comrade L.I. Brezhnev posed as the top-priority task, to develop a scientific, well thought through and economically well-grounded energy program for the long term. . . .

This conference aims to discuss measures which can be taken for the successful implementation of Central Committee directives on the efficient development of the fuel and energy complex, taking into account the growing requirements of Soviet society and the prospects for scientific and technological progress. We also consider it wise to review what supplementary measures must be adopted in order to complete the 1980 plan for construction and bringing on line of energy projects, so as to create a good point of departure for its growth in the Eleventh Five-Year Plan. . . .

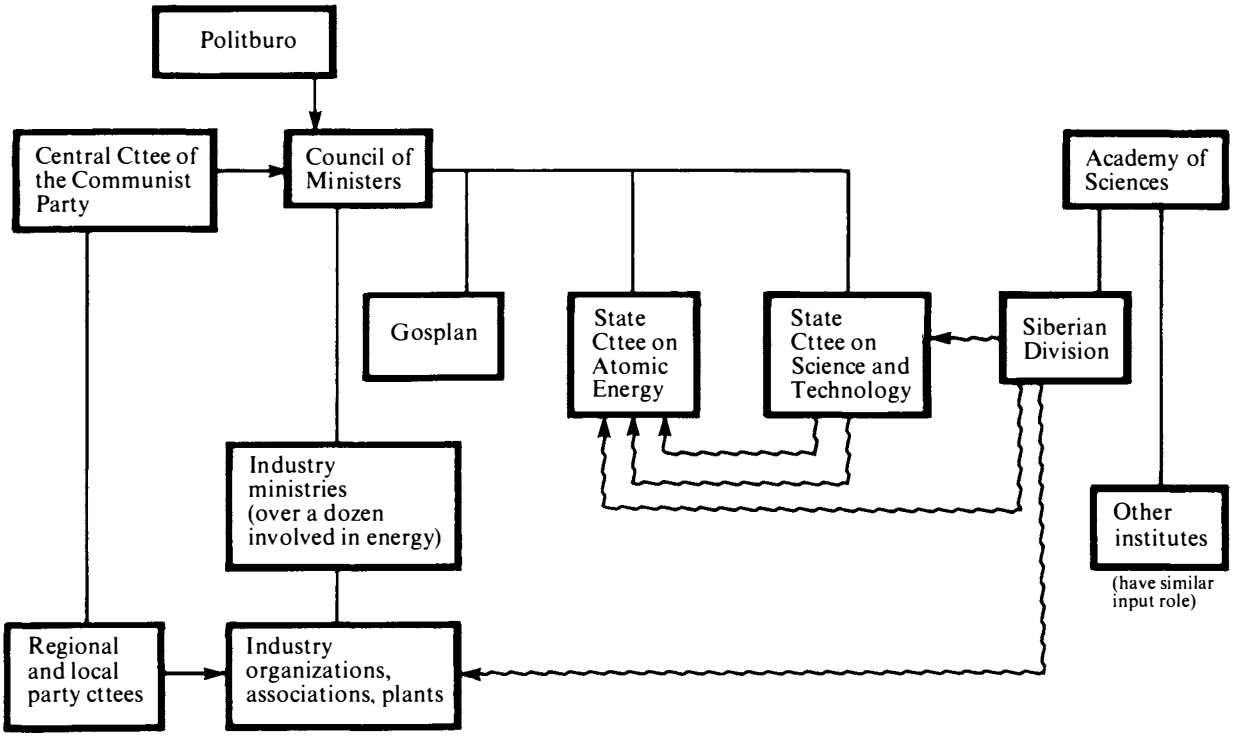
The most important task is to accelerate the rate of progress in science and technology for the electric power industry. It already leads the world in such categories as specific expenditure of fuel; per unit capacity of power plants; high tension electrical transmission lines; district heating development. And, it gives me pleasure to say, during the Tenth Five-Year Plan (1976-1980) our power systems are being equipped more and more with highly-efficient plants, powerful atomic reactors, and improved electrotechnical equipment.

In the past few years we have commissioned new power blocks at the Chernobylsk, Kursk, Leningrad, Byeloyarsk, Armenian, and Bilibinsk nuclear power plants. Major hydroelectric units have gone into use at the Sayano-Shushensk, Ust-Ilimsk, Nwieksk, and other hydroelectric stations. Construction of the most powerful conventional power plants in Europe, the Zaporozhe and Uglegorsk, has been completed. . . .

Our energy and electrotechnical machine building is the firm base for constant growth of Soviet electroenergy. In the Tenth Five-Year Plan, the technical reequipping and expansion of production at major machine plants has occurred. The capacity of the giant of nuclear machine building, the Volgodonsk plant Atommash, is rapidly growing. . .

Serious quantitative and qualitative changes in the power industry have characterized the Tenth Five-Year Plan. At the same time, the interests of further economic and social progress for our country . . . require that the Eleventh Five-Year Plan see a new, mighty upsurge of our power industry. . . .

As a whole, the program of the Eleventh Five-Year Plan marks the entry of our power industry into a qualitatively new phase of development. For it to be implemented will require a serious reform of the work methods of builders, drafters, machine producers and their users. In connection with the new directions of



Energy policy-making in the U.S.S.R.

This schematic of the Soviet chain of policy-making and implementation emphasizes the relationships discussed in our report. It is not exhaustive of the exchanges of policy recommendations and directives among the entities shown.

Lines with no arrows connect different levels of a single organization: the party, the government, the Academy.

Straight lines with arrows are lines of command.

Wavy lines with arrows are the routes of policy recommendations before the stage of implementation.

power industry development, especially nuclear, the scientific and design organizations, constructors and repairmen will have to solve bigger and more technologically complex problems.

A particularly large volume of work lies on the shoulders of the two-million strong army of workers and specialists of the U.S.S.R. Ministry of Energy. It is necessary to utilize more efficiently the existing production and scientific capabilities of this branch of industry. The ministry is obliged to achieve tangible results in reducing the lead-time on constructing power. . . . plan to use progressive design and new construction materials, reduce the expenditure of labor in erecting buildings and installations. . . .

I would like to say something also about the problem of modernizing and reconstructing power equipment. . . . Power workers state their readiness to modernize many of our power stations, but for this they need the equipment. This question deserves more attention and should be resolved at the planning level.

Another important question (is) the automation and management of technological processes. . . .

A.P. Kirilenko stressed that . . . it is our duty to think ahead of time about the power industry of the future. This means an expansion of the construction of atomic power stations with fast breeder reactors, stepping up work on controlled thermonuclear fusion, and utilizing solar and geothermal energy as well as superconductivity phenomena. the U.S.S.R. State Committee on Science and Technology, the U.S.S.R. State Planning Commission, the ministries, and agencies will of course go to work on these urgent scientific and technological problems, exhibiting a high level of responsibility, and ensure the solution of all problems connected with utilizing scientific discoveries, creating and introducing new technology.