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USSR Monthly Review



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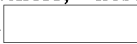
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USSR Monthly Review



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The *USSR Monthly Review* is published by the Office of Soviet Analysis. Comments and queries regarding the articles are welcome. They may be directed to the authors, whose names are listed in the table of contents. 

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| <p>With a rising commitment of investment and manpower to exploitation of its large oil reserves, the Soviet Union should be able to approach its oil production goal of 12.6 million barrels per day (b/d) for 1985. We expect, however, that in the late 1980s, with GNP growth continuing to decline, Moscow will not be willing to make the enormous investment outlays necessary to keep production stable, and oil output will slip to about 11-12 million b/d in 1990. Unless conservation and substitution programs are considerably more effective than we expect them to be, Moscow will then face hard choices in allocating oil output among domestic consumption, exports to Eastern Europe, and hard currency sales to the West.</p> | | |
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Moscow is turning to natural gas to satisfy most of its increasing demand for energy in the 1980s and to minimize the squeeze on its hard currency earnings should oil exports to the West taper off later in the decade. By 1990 gas will be the largest source of Soviet energy, with production reaching as much as 730 billion cubic meters a year—roughly equivalent to 12.1 million barrels a day of oil. Attaining this rate of production will almost certainly require large amounts of Western pipe and equipment. Although demand forecasts for gas have been trimmed, Western Europe's gas demand by 1990 will still provide a lucrative market for Soviet gas.

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Tengiz Discovery Adds to Kazakhstan's Oil and Gas Potential [redacted] 13

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Reserves of about 2.2 billion barrels of recoverable oil (roughly 4 percent of the USSR's A+B+C₁ reserves) and at least 200 billion cubic meters of sour gas have been found at Tengiz, near the northern end of the Caspian Sea. Development of these deposits will be extremely difficult, requiring large purchases of Western pipe and equipment because of the high reservoir pressures and temperatures and the presence of corrosive contaminants. The Soviets currently expect to produce only about 3 million tons of oil (60,000 barrels per day) and 2 billion cubic meters of gas from Tengiz in 1985, but output could rise to four times these amounts by 1990.

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Soviet coal production will show little growth during the 1980s. Although the industry managed last year to reverse a decline in output which began in 1979, further growth will be constrained by the failure to open new mines and by mine depletion in older coal basins. Moreover, most of the gain in raw coal production through 1990 will be offset by a continuing decline in the average energy content of the mined coal. Tight coal supplies will severely undercut Soviet plans to increase the use of coal in electricity production, and coking coal production will become a major bottleneck, substantially limiting the possibility for gains in steel production.

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| | Soviet energy policy is formulated, approved, and implemented within an essentially three-tiered decisionmaking hierarchy. Decisionmakers at successively higher levels integrate energy policy into progressively broader policy contexts but are dependent on lower levels for technical expertise. Politburo decisions that significantly alter the basic direction of energy policy usually are made only in response to important unanticipated problems because the decisionmaking process does not easily accommodate innovation and long-range planning. Sharp policy shifts made under stress, however, may carry significant costs. | | | 25X1 |
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Viewpoint

Outlook for Soviet Oil: A DIA Assessment



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A favorable outlook for Soviet oil production is based upon the existence of abundant energy resources among which petroleum is especially significant. Central planning assures continuity in the role of oil as a flexible instrument in energy development. For example, effective programs for oil conservation and fuel substitution are in place to permit a continuing key export role for petroleum through the late 1980s and beyond. Furthermore, prospects for continued high levels of essential hard currency earnings based on export of crude oil and, increasingly, of petroleum products are favorable.



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Energy and the Soviet Economy

Perspective: Moscow's Energy Policy for the 1980s

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A major driving force behind Soviet energy policy is Moscow's desire to remain self-sufficient in energy supplies. As the Soviets themselves have noted, "The Soviet Union is currently the only highly developed country in the world meeting its own fuel and energy needs from its own resources." The articles in this issue illustrate Moscow's intent to maintain energy independence and describe the difficulties it faces in exploiting Siberian energy resources while at the same time satisfying the investment requirements of other sectors of the economy.

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In addition to heavy emphasis on West Siberian oil and gas, the major elements of Soviet energy policy for the 1980s include increased substitution of gas for oil and energy conservation, especially through modernization of industrial production facilities. To a large extent, the current strategy is driven by the leadership's awareness that it will probably have to accept a decline in oil production in the late 1980s. This prospective decline—already being acknowledged by planners—defines the need for conservation and substitution and forces continued heavy investment in West Siberia as a holding action.

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Despite Moscow's willingness to date to boost investment in energy, we believe that by the mid-to-late 1980s the USSR will be unable to provide the investment required simultaneously to:

- Keep oil production from falling.
- Expand secondary refining capacity to permit a shift in the structure of refined products.
- Provide the processing, distribution, and storage facilities to handle the increasing output of natural gas.
- Offset the drop in the energy content of mined coal.
- Accelerate development of nuclear power.
- Provide new equipment to meet the ambitious conservation and substitution goals.
- Satisfy the needs of the nonenergy sectors of the economy (including defense).

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The rapidly rising unit costs of energy production, processing, and distribution will exacerbate the continuing sharp decline in overall capital productivity. Soaring requirements for investment in energy will limit the opportunities to substitute capital for labor—the key to raising productivity—elsewhere in the economy. The energy sectors, including associated infrastructure, are scheduled to receive more than one-half of the increment in total investment during the 11th Five-Year Plan (1981-85), and this share will have to rise still further unless total investment growth is increased sharply. While some increase is possible, an abrupt acceleration in total investment growth will be hampered by problems in metallurgy and machinery production—increasing the competition for investment goods, consumer durables, and defense hardware. [redacted]

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Because of the investment squeeze and the increasingly complex technical requirements in energy production, we believe the USSR will have an even greater need for Western equipment and technical expertise in the 1980s than it did in the 1970s. An analysis of Soviet equipment manufacturing capabilities and continuing problems in the oil industry indicates that requirements in the 1980s will center on Western equipment and technology for deeper drilling, fluid lift, and well completion and servicing. In addition, sophisticated exploration equipment, offshore drilling platforms, and secondary oil refining technology will be crucial to preventing an oil shortage later in the decade. Because gas is so important to maintaining total Soviet energy production growth in this decade, continued imports of large-diameter pipe, pipelayers, pipe-wrapping and insulating materials, and turbine-compressors will be necessary. Western equipment and technology will be especially critical for exploiting some newly discovered “sour” gas deposits, as noted in the article on the Tengiz reserves. [redacted]

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Despite the increased resource commitment to energy in the 11th Five-Year Plan, we believe the combined output of oil, natural gas, and coal will increase only 11 to 12 percent in 1981-85 compared with the 17 percent planned for this period and the 22 percent achieved in the last five-year plan. As yet, the Soviets have not specified their energy production goals for 1990, but, in our judgment, combined fuels output will grow by only 6 to 7 percent in the latter half of the decade under the best of circumstances. At the start of the 1990s, gas will be the largest source of Soviet energy. Indeed, with oil output in decline by the late 1980s and coal production stagnant in terms of energy content, the increases we foresee in fuel availability will be largely the result of rising gas output. (This assessment of Soviet energy production possibilities is not universally shared within the Intelligence Community. See the article in this month's Viewpoint section.) [redacted]

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Whether oil production falls or not, one of the keys to the success of Soviet energy policy will be the success with which increased gas supplies are managed within the economy. The Soviets are faced with limits to the amount of gas that can be absorbed domestically. Even though the long-distance gas transmission network is being expanded rapidly, construction of gas processing, distribution, and storage facilities is lagging. Outside the industrial, electric power, and to a lesser extent, the housing and government sectors, the opportunities for greatly increased gas use are limited. Only in the electric power sector do the Soviets have concrete plans for interfuel substitution. But because of delays in completing gas-fired power plants and building lateral gas distribution lines, we estimate that only 60 to 65 percent of the 1985 target for incremental gas use in the electric power sector can be met. [redacted]

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Although Soviet plans call for energy conservation throughout the economy, the current structure of energy demand and the nature of the Soviet economic system will restrict the savings that can be achieved. Much of the conservation program—including installation of more energy-efficient equipment, wider use of secondary energy resources, dieselization of the motor vehicle fleet, increased centralization of heat supply, and improvement of energy consumption monitoring procedures—will involve large new expenditures at a time of fierce competition for investment resources. Soviet officials themselves have admitted that conservation progress has STAT been slow and that the potential for energy savings in several areas (improving the efficiency of rail transportation and reducing the consumption of fuels for electricity generation, for example) is being exhausted [redacted]

This prospective energy picture implies reduced rates of growth for the Soviet economy through the 1980s. Oil requirements are likely to outstrip supplies, and Soviet growth prospects are not likely to turn around before 1990. If the current emphasis on oil and gas founders in the late 1980s, the main thrust of Moscow's energy policy is likely to change later in the decade. Indeed, coal and nuclear power may once again come to the fore as suggested by recent Soviet references to a new 20-year energy program. By the 1990s advances in technology may make viable such projects as coal-slurry pipelines and long-distance transmission of coal-based electricity. Nuclear power is also likely to play a larger role in Soviet energy supply in the 1990s. Nonetheless, until such programs become a reality, the Soviets face costly energy problems that will absorb much of their attention and resources through the end of this decade. [redacted]

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Soviet Oil Supply Prospects for the 1980s

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Production of oil and gas condensate in the USSR now stands at 12.4 million barrels per day (b/d), only 300,000 b/d more than in 1980. Though still posting small annual gains, the oil industry has not reached an annual production target since 1972. In our judgment, the recent increases were made possible only by a willingness on the part of the government to fund an enormous and costly brute-force development effort in remote West Siberia, now the source of some 58 percent of Soviet oil output. With reserves estimated at 50-70 billion barrels, Moscow should be able to approach its production goal of 12.6 million b/d for 1985. Thereafter, we expect, production will level off and then decline slowly to about 11-12 million b/d by 1990.¹

Production Problems

The prospective tapering off in Soviet oil production results largely from planning and strategy choices made during the 1970s, increasingly difficult field conditions in the oil regions, and often mediocre performance on the part of the oil industry:

- Outside of West Siberia only two major onshore oil-producing regions, Komi and Kazakhstan, are not in decline, and both will remain relatively small producers throughout this decade. The Soviets concede that their promising offshore areas will contribute little before the 1990s.
- Our engineering analysis indicates that by the late 1980s production will be declining rapidly at most of the supergiant and larger giant fields on which the Soviets have relied for the bulk of their oil over the past two decades. Offsetting the decline in production from giant fields will require a greatly expanded effort to produce oil from smaller deposits, which yield disproportionately lower returns for a given drilling effort.

- Though the remaining hydrocarbon resources of the Soviet Union are potentially among the largest in the world, the Soviets are already producing oil from the highest quality deposits in their favorably located oil reserves. Since the mid-1970s, well flow rates have steadily declined and water cuts have rapidly increased even in oil-rich West Siberia, sure signs that the best reserves are being depleted and that the Soviets must work increasingly hard just to keep production from falling. To make matters worse, new deposits tend to be progressively deeper, harder to drill, and more remotely located.
- Emphasis on maintaining high rates of production growth has resulted in Soviet failure thus far to implement an exploration program adequate for proving up substantial new reserves, especially outside West Siberia. Consequently, potentially oil-rich portions of the Arctic, East Siberia, and even parts of West Siberia will contribute little significant new oil output until the 1990s.
- Though the Soviet Union produces the bulk of equipment used by its oil industry and Soviet researchers are well-versed in the applicable technical theory, special applications (such as sophisticated exploration, deeper drilling, sour gas, offshore positioning and drilling, and secondary refining) will require infusions of Western equipment and technology in the foreseeable future.
- Despite the priority accorded oil production, the oil industry suffers from the same kinds of inefficiency, poor performance, and bureaucratic mismanagement that tend to plague other civilian sectors of the Soviet economy.

Supply Outlook

None of the problems enumerated above would individually preclude the Soviets' maintaining some growth in oil output over the rest of this decade. But taken together they have dramatically raised the

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average and marginal costs of producing a barrel of crude. The Soviets plan to increase the oil industry's share of industrial investment from 12 percent in the previous five-year plan (FYP) to 16 percent in the current plan. This increase means that one-third of the increment in industrial investment funds will go to the oil sector during 1981-85. Assuming the Soviets follow through with these investment plans, they will probably come close to their announced production target of 12.6 million b/d for 1985.

Given the apparent adequacy of the reserve base, Soviet oil production beyond 1985 will be largely determined by the investment options chosen by Soviet leaders. For the 12th FYP (1986-90), Soviet planners will probably be choosing from among three general investment options:

- We believe that they are most likely to opt for a continued increase in the flow of economic resources to the oil industry over the coming 12th FYP but will find it difficult to accelerate the already rapid pace of oil industry investment. This strategy would most likely result in production plateauing at about 12.5 million b/d by 1985 and subsequently declining slowly, perhaps to between 11 and 12 million b/d by 1990. Though such a program would still be expensive—investment would have to double between now and 1990—it would be consistent with Moscow's past willingness to make the effort needed to avoid an energy crisis.
- With an enormous increase in investment, the Soviets could hold production between 12 and 13 million b/d until 1990. Oil reserves appear adequate, but we believe the costs of exploiting them would be prohibitive: investment would roughly have to triple, and the number of wells on artificial lift would have to double to help pump roughly 20 million b/d of additional water. This option would be very expensive and, without some unforeseen windfall discoveries soon, would create a drag on other sectors of the economy.
- At the other end of the spectrum, the Soviets—if dogged by increasing production problems and worse-than-expected geologic conditions in their oil fields and forced to shift investment rubles to other hard-pressed industries—could choose to halt the

growth of resources going to the oil industry after the end of this FYP. Such an approach could result in production peaking by 1985 and subsequently falling as low as 9 or 10 million b/d by 1990. This option could, in our view, create a serious gap between Soviet oil supply and demand.

Though the situation might change, we believe the Soviets are now moving in the direction of the first option. Recent speeches by Andropov, together with public and private statements by senior spokesmen of the oil and gas industries and the still sketchy details of the new 20-year energy plan, convince us that Moscow is feeling the investment pinch. These sources suggest that Soviet planners are attempting to shift the energy investment balance from oil to the currently more cost-effective gas. If this process continues—and it would represent a rational choice—little, if any, further growth in Soviet oil output would occur beyond 1985.

Economic Implications of the Slowdown

Assuming the Soviets choose the first option, our projections of Soviet economic performance in the 1980s indicate that growth of GNP will continue to decline—from over 2 percent during the current five-year plan period to between 1 and 2 percent during the 12th Five-Year Plan (1986-90)—regardless of whether the Soviets achieve the low or high side of the projected oil production of 11-12 million b/d by 1990. The eventual level of oil production does have an impact—during the 12th Five-Year Plan economic and industrial growth are projected to be marginally higher for the upper end of the oil estimate than for the lower end. Nonetheless, if future oil output falls within the range we now expect, oil requirements are likely to outstrip supplies and Soviet growth prospects are not likely to turn around this decade.

Any shortfall in oil available to the domestic economy would result in reduced use of capital equipment if other fuels cannot provide an offset. That is, there would not be enough fuel to operate at normal rates all of the factories, trains, trucks, and so on that make up the USSR's capital stock. Oil use could be reduced in various ways. The most efficient method would be

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to retire equipment that uses the most oil relative to what it produces for the economy. Given the USSR's cumbersome approach to economic management, however, we are more likely to see the across-the-board imposition of restrictions on energy use in industrial ministries and factories and tighter allocation policies. Open sources make it clear that such limits have been used extensively over the past year or so to cope with electric power shortages. In effect, these restrictions represent a type of crisis management directed toward coping with specific problems associated with any energy shortfall. They are not an effective substitute for a more rational and longer term approach to energy-efficient use of capital resources and result in a larger-than-necessary penalty on economic performance.

At worst, such unplanned disruptions can damage both work in progress and capital equipment. For example, in January *Pravda* reported that, because of power shortages, oil production by the Nizhnevartovsk Petroleum Administration in West Siberia was thousands of tons less than it should have been. The article also noted the large number of premature machinery breakdowns (in electric loaders, for example) caused by the disruptions in electric power supplies. We expect to see more problems of this nature if energy imbalances become more severe.

Policy Implications of the Slowdown

The possibility of an oil production plateau poses serious problems for Soviet planners and policymakers, given the oil demand outlook for the 1980s. In 1990 Soviet internal requirements for crude oil should grow to 9.5 or 10 million b/d, up from 8.9 million b/d in 1980. By the Soviets' own admission, an ongoing conservation program has been largely unsuccessful, primarily because the structure of domestic oil consumption does not lend itself to substantial discretionary cuts in use, and the price system does little to help reduce demand. Though some gains have been made in the substitution of gas for oil, opportunities to substitute both additional gas and coal appear to be limited by investment considerations, the apparent inability of the transportation network to provide reliable delivery of coal, and the large proportion of heavy fuel oil in refinery output.

Neither can the Soviets, in our judgment, afford to make substantial near-term cuts in the more than 3 million b/d of oil currently being exported. About two-thirds of this amount supplies Eastern Europe with roughly three-fourths of its oil needs. Though Moscow has recently imposed selective cuts of 10 percent on some of its soft currency buyers, we believe that only very small and gradual additional cuts in supplies to Eastern Europe are possible during this decade. Reductions over the short term of as little as 100,000 b/d could appreciably diminish Eastern Europe's economic prospects, and cuts greater than 200,000 b/d could risk driving some of these economies into absolute decline.

About one-third of Soviet oil exports are sold on the Western market and represent the Soviets' principal source of hard currency needed to purchase grain and foreign technology. Moscow has indicated that it intends to sustain hard currency earnings—even to the point of accepting some reduction in domestic economic growth. Even allowing for increased sales of gas to Western Europe, the Soviet Union's total requirement for oil (domestic and export)—if unconstrained by supply—should continue to hover between 12 and 13 million b/d through the 1980s.

The oil policies the Soviets choose and the production levels achieved will depend on many factors, most of which are beyond the control of the oil industry: the general state of the economy and key sectors like agriculture; the Soviet perception of the military balance; the state of the world oil market; the success of the development and export program for Siberian natural gas; the Soviet success in substituting gas for oil in the domestic economy; and the stability and confidence of the new leadership.



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**Soviet Natural Gas:
Outlook for the 1980s**

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Moscow is turning to natural gas to satisfy most of its increasing demand for energy in the 1980s and to minimize the squeeze on its hard currency earnings should oil exports to the West taper off later in the decade. Because of the generally low quality of Soviet manufactured goods, gas exports offer the only substantial prospect for bolstering foreign exchange earnings. To promote an export market for gas, Moscow will probably exploit its ability to undersell any prospective competing supplier of natural gas to Western Europe.

By 1990 gas will be the largest source of Soviet energy, with production reaching as much as 730 billion cubic meters (m³) a year—roughly equivalent to 12.1 million barrels a day of oil (bdoe). Attaining this rate of production will almost certainly require large amounts of Western pipe and equipment. Although most of the equipment is available from Western Europe and Japan, the outlays for extensive pipeline construction and gasfield development, together with associated requirements for infrastructure, will increase the strain on Soviet investment resources.

Background

Since 1977 natural gas output has grown at an average annual rate of nearly 8 percent—much faster than any other form of energy production in the Soviet Union (see table 1). Gas output now provides two-thirds as much energy as oil, compared with about one-half as much in 1977. In March of this year, West Siberia—now the center of Soviet gas production—had produced over a trillion m³ of natural gas since commercial output started there in 1966. One-half of this amount came from just one giant gasfield, Medvezhye, which began to produce in 1972. The Medvezhye and Urengoy gasfields currently account for nearly 40 percent of the USSR's natural gas production, and we expect their contribution to increase to nearly 50 percent by 1985.

Table 1

Billion cubic meters

USSR: Production of Natural Gas

| | Amount | Change From Previous Year |
|------|--------|---------------------------|
| 1976 | 321 | |
| 1977 | 346 | 25 |
| 1978 | 372 | 26 |
| 1979 | 407 | 35 |
| 1980 | 435 | 28 |
| 1981 | 465 | 30 |
| 1982 | 501 | 36 |

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The Role of Gas in Soviet Energy Plans for the 1980s

The Soviets plan to raise the share of natural gas in total primary energy production from 26 percent in 1980 to 32 percent in 1985. In order to achieve this goal, they will have to:

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- Raise annual production to 630 billion m³ (10.4 million bdoe) by 1985.
- Build 50,000 kilometers of new natural gas pipelines in 1981-85, including six transcontinental 1,420-mm trunklines totaling 20,000 kilometers in length (see table 2). (About 14,000 kilometers of 1,420-mm pipelines were built in 1972-80.)
- Construct up to 370 compressor stations which would boost capacity by 25,000 megawatts (MW) from 18,000 MW of operating power to 43,000 MW.
- Accelerate development of the giant Urengoy gasfield to boost its production from 50 billion m³ in 1980 to 270 billion m³ in 1985 and perhaps to 300 billion in 1990. Virtually all of the USSR's planned 1981-85 increase in output is to come from this field, and production in other regions of the USSR is to be held constant.

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Table 2
Major Gas Trunklines Planned for 1981-85

| Pipeline | Length (km) | Status |
|--|----------------|---|
| Scheduled | | |
| Urengoy-Ukhta-Gryazovets-Moscow | 2,800 | Complete |
| Urengoy-Punga-Petrovsk | 2,835 | Complete |
| Urengoy-Punga-Novopskov | 3,345 | Complete |
| Urengoy-Pomary-Uzhgorod I (export line to Western Europe) | 4,450 | Pipelaying about three-fourths complete; compressor station construction about one-tenth complete |
| Urengoy-Pomary-Yelets-Center I | 3,250 | Construction recently started |
| Urengoy-Pomary-Yelets-Center II | 3,250 | Not started |
| Under consideration | | |
| Urengoy-Pomary-Uzhgorod II | 4,450 | Not started |

The total investment required to implement the 1981-85 gas industry development projects will probably exceed 50 billion rubles—roughly 7 percent of total Soviet investment planned for 1981-85. Nearly one-half this amount will go for gas well drilling and production installations; most of the remainder will be required for pipeline construction. [redacted]

Factors Affecting Plan Fulfillment

As a result of delays in construction of gas-gathering lines and gas processing plants, only one-half of last year's new wells were connected with the gas processing and transmission system. Transportation bottlenecks are much to blame for the slow delivery of equipment and construction material. Only one railroad serves Urengoy, and the backlog of freight awaiting shipment extends all the way to factories in the Ukraine. The river navigation system and ports in the Ob' River delta area are also overloaded because of the heavy pipeline construction program and the short ice-free shipping season. Shortages of electric power in the Urengoy area also have retarded drilling and construction work. [redacted]

The gas industry's logistical and infrastructural problems in northern Tyumen' are exacerbated by technical considerations. Starting this year, the Soviets hope to develop the deeper, Valangian gas condensate deposits at Urengoy at depths of 2,000 to 4,000 meters. Up to now only the Cenomanian reservoirs have been exploited at relatively shallow 1,300-meter depths. The increasingly deeper drilling and higher reservoir pressures that will be encountered will increase drilling problems and reduce the productivity of drilling brigades in terms of meters drilled. The high gas reservoir pressures present substantial risk of blowouts. Gas drillers, therefore, must drill cautiously in the presence of high-pressure gas pockets—especially in the deeper overpressured gas condensate formations. [redacted]

The deeper gas condensate deposits will also be more difficult to exploit because of water and natural gas liquids accompanying the gas. The production of liquids in the Arctic is difficult and dangerous, especially if freezing hydrates plug or burst wellhead equipment. Also, liquids of any kind tend to collect in the bottom of older gas wells and to reduce the flow of gas. The higher proportion of liquids in the gas produced from deep wells also requires more complex gas processing plants to remove the water vapor and extract the valuable natural gas liquids prior to pipeline shipment. [redacted]

Production Outlook for the 1980s

Natural gas production probably will rise to about 590-600 billion m³ (9.8 million bdoe) in 1985, some 35-45 billion m³ (0.6 million bdoe) below the current plan. Lags in gas well drilling, transportation bottlenecks, and shortages of electric power will constrain natural gas production in the first half of the decade. By 1990 output could reach as much as 730 billion m³ (12.1 million bdoe). [redacted]

We estimate that the USSR will be able to produce more gas than it can ship via pipeline throughout most of the 1980s. It should be considerably easier to drill and complete 200 to 300 new gas wells at Urengoy, capable of producing 250 billion m³ (4.2 million bdoe) per year by 1985, than it will be to equip and fully

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power six new 3,000-km transcontinental pipelines to transport this volume of gas. We believe that pipelaying for all six lines—but not all of the compressor stations required to fully power the lines—will be completed in 1985. Moreover, we do not expect plans for new gas processing capacity at Urengoy to be met by that time. Last year, for example, only one of three planned gas processing plants was placed in operation, and only two-thirds of the annual plan for construction of gas-gathering facilities was completed. [redacted]

Export Prospects

On economic grounds, the prospects for increased exports of Soviet natural gas to West European countries into the 1990s are good. Although demand forecasts for gas have been trimmed, Western Europe's gas demand by 1990 will still provide a lucrative market for Soviet gas. Under existing contracts (including expected sales to Italy), Soviet pipeline exports of gas to Western countries are scheduled to increase from nearly 30 billion m³ (0.5 million bdoe) in 1981 to about 58 billion m³ (1.0 million bdoe) in 1990. At today's prices, this increase could bring in additional hard currency earnings of roughly \$4 billion. Gross exports of Soviet gas, including sales to both East European and West European buyers, might expand from 62 billion m³ (1.0 million bdoe) to 100-120 billion m³ (2.0 million bdoe) during the same period (see table 3 [redacted])

Beyond 1990 Soviet gas exports to the West could double again by the end of the century. The USSR will probably maintain its ability to undersell other sources of primary energy and continue to enlarge its share of the gas market. At some point, of course, buyer recognition of the potential strategic and political consequences of expanding reliance on Soviet gas could result in limits on the amounts purchased. [redacted]

In the foreseeable future, the USSR will probably be able to undersell by a wide margin alternative gas suppliers such as Norway and Algeria. Despite the remoteness of the West Siberian gasfields, Soviet production and transportation costs for gas are low, in no small measure because of Moscow's willingness to accept a low rate of return on natural gas investment. The Soviets' ability to deliver gas to Western Europe at a cost of less than \$1 per million Btu—a small fraction of the costs faced by non-Soviet suppliers—will tend to deter financing of new Western gas

Table 3
USSR: Exports of Natural Gas

Billion cubic meters

| | 1981 | 1990 (Planned) |
|----------------------|-------------|-------------------|
| Eastern Europe | 32.1 | 45-60 |
| Poland | 5.3 | |
| Czechoslovakia | 8.4 | |
| East Germany | 6.3 | |
| Bulgaria | 4.6 | |
| Hungary | 3.8 | |
| Romania | 1.5 | |
| Yugoslavia | 2.2 | |
| Western Europe | 29.8 | 55-60 |
| Austria | 3.2 | 4 |
| West Germany | 11.9 | 22-24 |
| Italy | 8.1 | 15-17 |
| France | 5.8 | 12-13 |
| Finland | 0.8 | 2 |
| Total exports | 61.9 | 100-120 |

development projects in Norway and Africa. The viability of some of these projects has already been called into question by the impact of lower oil prices on Western gas demand. [redacted]

The Soviets will also be in a position to affect West European oil prices insofar as direct substitution of gas for oil is possible. In order to further penetrate the West European market, Soviet gas must undersell residual fuel oil. However, the most recent gas contracts with West Germany and France call for payment in deutsche marks and francs, with Soviet gas prices pegged to residual, gas-oil, and crude oil prices denominated in dollars. Given the oil price reductions and currency devaluations since 1981, Soviet gas is still a bargain at an estimated \$3 to \$3.50 per million Btu. However, persistent weakness in the price of oil would likely impinge on the Soviet Union as well as on other suppliers of natural gas, because the incentive in Western Europe to substitute gas for oil would be reduced. [redacted]

Tengiz Discovery Adds to Kazakhstan's Oil and Gas Potential

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Reserves of up to 300 million tons of recoverable oil (about 2.2 billion barrels) and at least 200 billion cubic meters of sour gas have been found at Tengiz, just east of the northern end of the Caspian Sea, according to Soviet reports. The general area—known geologically as the Pre-Caspian Depression—contains at least five other recent commercial discoveries: gas at Astrakhan' (6 trillion m³) and Karachaganak (500 billion m³), oil at Kenkiyak (200 million tons), and unknown amounts of both oil and gas at Zhanazhol and Tazhigali.

output could rise to 12 million tons of oil and 8 billion m³ of gas annually by 1990. At that time, about 1 million tons of natural gas liquids, 2 million tons of sulfur, and some carbon dioxide will also be recovered each year at Tengiz for industrial use. In the future, pipelines for transporting condensate and carbon dioxide will have to be constructed.

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Although the massive gasfields of Urengoy, Yamburg, and the Yamal area of West Siberia contain the bulk of the reserves contributing to the Soviet Union's imminent emergence as the world's leading producer of natural gas, the Kazakhstan gas deposits have special importance. They will provide a convenient source for supplying more gas to the Caucasus, which has been cut off for some time from Iranian gas, and will help offset declines in gas supply there and elsewhere as fields in Central Asia and around Orenburg play out. Tengiz oil, while only about 4 percent of the USSR's A + B + C₁ reserves, will be a welcome supplement to Caspian offshore oil in bolstering oil supply in the southern regions of the USSR. In addition, both the gas and oil from the Kazakhstan deposits will provide large amounts of condensate, sulfur for industrial use, and carbon dioxide for enhanced oil recovery applications.

Each of the new Kazakhstan development projects will present extremely difficult technical challenges. The required equipment and technology to cope with adverse conditions in the six deposits, located 4,000 to 5,000 meters deep in Paleozoic-Carboniferous sediments, exceed the current capability of the Soviet oil and gas industries. Without large purchases of Western pipe and equipment, drilling and production operations in these fields will be extremely hazardous.

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Most of the deep reservoirs in the Pre-Caspian Depression are overpressured accumulations, with high temperatures and high percentages of contaminants—as high as 24-percent hydrogen sulfide and 24-percent carbon dioxide. The equipment required for each deep well must be carefully determined and ordered up to 12 months before the start of drilling.

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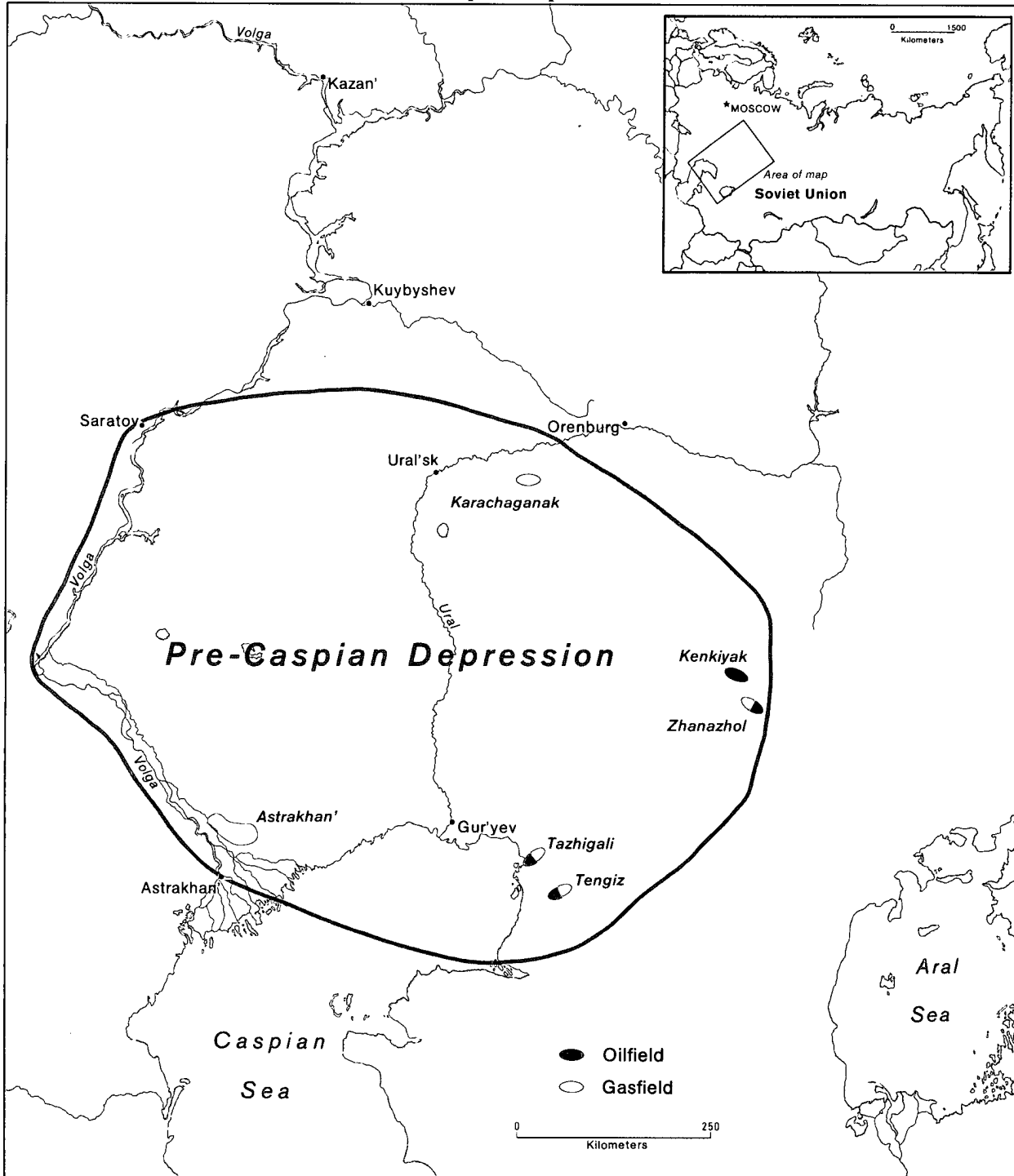
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About 2,000 deep wells to produce both oil and sour gas may eventually be drilled at Tengiz; initial plans call for at least 100 wells during 1983-88. Soviet discussions with Western pipe suppliers have led to speculation that as much as \$5-10 billion worth of high-nickel, high-chrome stainless steel casing, tubing, and other seamless pipe ultimately will be needed for this project. About 25 percent of the project cost would go for the producing wells, 25 percent for the gathering system and surface installations, and 50 percent for oil and gas processing plants. The Soviets currently expect to produce only about 3 million tons of oil and 2 billion m³ of gas from Tengiz in 1985, but

The high content of corrosive contaminants poses a special set of technical problems and related equipment requirements for oil and gas production. Drilling, producing, and pumping equipment must be made of special corrosion-resistant steel to avoid undue equipment failures. For example, non-corrosion-resistant steel will relatively quickly become brittle and subject to failure as a result of exposure to hydrogen sulfide and carbon dioxide. Casing corrodes, develops leaks, and may even collapse, rendering a well inoperable. Most of the wells, which will be more than 4,000 meters in depth and overpressured, will entail substantial risk of hydrogen sulfide gas leakage which, in turn, poses a threat to life and is a fire hazard. Each of the development projects will involve production of different ratios of oil, natural gas liquids, gas, sulfur compounds, and carbon dioxide

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New Oil and Gas Discoveries in the Pre-Caspian Depression



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Estimated Equipment Purchases for Initial Phase of Astrakhan'-Type Project

| | Possible (Non-US) Suppliers | | Possible (Non-US) Suppliers |
|---|---|--|--|
| Drilling equipment (\$10-20 million) | | Field gathering systems (\$150-300 million) | |
| Surface: Blowout preventers, hydraulic controls, wellheads. | Argentina Brazil Mexico Canada | Surface: Storage and pumping equipment. | Canada |
| Subsurface: Drill pipe, tool joints, drill collars, kelly joints, casing and special rotary tools, formation-testing and well-logging equipment. | Mexico Canada West Germany France Finland Italy United Kingdom Netherlands Norway | Subsurface: Small-diameter pipelines. | West Germany France Italy Japan United Kingdom |
| Production equipment (\$100-200 million) | | Oil- and gas-processing plants (\$50-500 million) | |
| Surface: Christmas trees, snubbers, valves, workover rigs and tools, pumps, field flow lines, field processing equipment. | Canada Mexico West Germany France Italy United Kingdom Japan | Installations for the separation of oil, water, and gas streams and the extraction of natural gas liquids, sulfur, and carbon dioxide. | Canada West Germany France Italy Japan United Kingdom |
| Subsurface: Well casing, tubing, well cementing and perforating equipment, wireline tools, mandrels, packers, valves for gas lift operations, submersible pumps and cable, miscellaneous downhole equipment. | Japan Brazil Mexico United Kingdom | Pipeline transportation (\$500 million-1 billion) | |
| | | Surface: Compressors and pump stations, pipelayers, bulldozers, computer-telecommunications system and controls. | France Italy West Germany Japan Netherlands Switzerland |
| | | Subsurface: Linepipe, valves (gate and ball), pigs for cleaning pipe, wrapping and coating materials, corrosion-prevention equipment. | Sweden Italy West Germany France Netherlands |



mixed with some amount of water. At 4,000-meter depths the reservoir pressures range from 7.0 to 10.0 megapascals (10,000 to 15,000 pounds per square inch), and temperatures of 100 to 200 degrees Celsius are reported to exist.

Drilling disasters are most easily avoided by procuring from the West specially designed corrosion-resistant equipment made of stainless or monel steel. Until recently, the most critical equipment items came from the United States, but other suppliers are now competing. US drilling equipment, including seamless tubular steel—casing, tubing, drill pipe, drill collars—and workover tools have been purchased for development of Astrakhan', the first of the recent Pre-Caspian discoveries. We expect future Soviet equipment orders for development of other fields in the

Pre-Caspian Depression to be about the same as for Astrakhan'. Key categories of equipment, together with their estimated value for the initial phase of a single project such as Tengiz or Astrakhan', and potential non-US suppliers are listed in the table. Contracts will soon be let for Tengiz, Karachaganak, and Zhanazhol. Others may soon follow for Tazhigali and Kenkiyak.



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Prospects for Expanding Coal Production and Use



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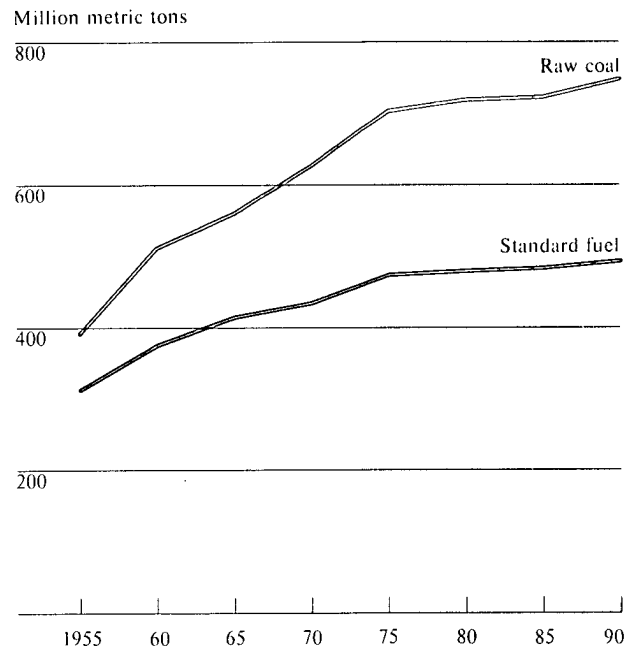
Soviet coal production will show little growth during the 1980s. Although the industry managed last year to reverse a decline in output which began in 1979, further growth will be constrained by the failure to open new mines and by mine depletion in older coal basins. Moreover, most of the gain in raw coal production through 1990 will be offset by a continuing decline in the average energy content of the mined coal (see graph).

During the remainder of the decade, tight coal supplies will sharply curtail Soviet efforts to build large coal-fired power plants, undercutting plans to increase the use of coal and decrease the use of oil for generating electricity. Therefore, to limit the use of oil, the Soviets will have to place even greater reliance on natural gas as fuel for power plants. We also project that Soviet coking coal production will be below the level needed to achieve the target for steel output and other industrial uses (including export commitments) in 1985.

Production Problems and Their Implications

Soviet miners ended the coal industry's three-year decline in output with production of 718 million metric tons of raw coal in 1982, a 14-million-ton increase over 1981. However, production was still 10 million tons below the 1982 goal—marking the seventh consecutive year that output has fallen short of plan. The key basins posted only small increases in output; more than 35 percent of last year's gains came from minor basins with little potential for further growth. The 1982 production gains reflect a temporary recovery from unusually severe problems with equipment availability and the supply of electricity for mine operations during 1981. The output growth probably is not sustainable. Since 1978, of the eight main basins that provide more than 80 percent of Soviet coal production, half have posted declining annual output, one is maintaining output, and three are increasing production (see table).

Soviet Coal Output Trends in Terms of Raw Coal and Standard Fuel Equivalent



Note: The output trends are based on comparisons at five-year intervals; therefore annual variations are not shown.

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Four major problems are hampering Soviet coal production:

- Mining conditions in underground operations are deteriorating rapidly; mine depth is increasing, seam thickness is decreasing, and methane concentrations are rising, particularly in the Donets and Kuznetsk Basins. These basins account for about 50 percent of raw coal production and about 75 percent of coking coal output.

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USSR: Coal Production ^a

Million metric tons raw coal

| | 1975 | 1980 | 1981 | 1982 | Soviet Plan | | CIA Estimate ^b | |
|----------------|------------|------------|------------|------------|-------------|------------|---------------------------|------------|
| | | | | | 1983 | 1985 | 1985 | 1990 |
| Total | 701 | 716 | 704 | 718 | 723 | 775 | 720 | 745 |
| Western USSR | 366 | 338 | 326 | 334 | 332 | 341 | 308 | 285 |
| Donets | 223 | 204 | 198 | 201 | 201 | 210 | 190 | 175 |
| Moscow | 34 | 25 | 22 | 24 | 23 | 20 | 15 | 10 |
| Pechora | 24 | 28 | 28 | 28 | 28 | 28 | 28 | 30 |
| Urals | 45 | 44 | 43 | 44 | 44 | 45 | 40 | 35 |
| Other | 40 | 37 | 35 | 37 | 36 | 38 | 35 | 35 |
| Eastern USSR | 335 | 378 | 378 | 384 | 391 | 434 | 412 | 460 |
| Ekibastuz | 46 | 67 | 68 | 70 | 73 | 84 | 80 | 110 |
| Karaganda | 46 | 48 | 49 | 49 | 50 | 50 | 50 | 40 |
| Kuznetsk | 138 | 144 | 144 | 143 | 143 | 154 | 140 | 145 |
| Kansk-Achinsk | 28 | 35 | 35 | 37 | 40 | 48 | 48 | 65 |
| South Yakutiya | 0 | 3 | 3 | 4 | 4 | 12 | 8 | 12 |
| Other | 77 | 81 | 79 | 81 | 81 | 86 | 86 | 88 |

^a Data for 1975 are from the No. 4 issue of *Ugol'*. Production figures for 1980-82 are based on data from various Soviet press and mining industry publications.

^b Midpoint of ranges.

- Too little new capacity is coming on line to offset the stagnating or declining production in older coal basins.
- Shortages of labor and declines in labor productivity are becoming more acute, especially in the older coal basins in the western USSR.
- Development of the large basins east of the Urals is constrained by the poor quality of these deposits, slow progress of research on coal enrichment, lack of transportation capacity for movement of coal, and unresolved technical problems relating to transmission of electricity from mine-mouth power stations to consuming areas.

Worsening mining conditions limit output and boost the real cost of coal production in several ways. Deeper mines require more machinery to bring the coal to the surface and to perform auxiliary tasks, such as equipment repair and ventilation. Thinner coal seams become increasingly difficult to mine with

existing equipment. These problems are significant at the Donets Basin, the country's largest coal producer, where mine depth is increasing by about 11 meters per year and the current average thickness of seams is only three-fourths that of the seams being worked a decade earlier.

The Soviets have only been able to compensate partially for the mine depletion in older basins, such as Donets, by adding new production capacity.¹ During 1976-80 gross annual additions of new capacity fell to an average of about 18 million tons, the lowest level since the 1961-65 plan period. At the same time, annual mine depletion increased to some 15 million tons, up from about 7 million tons a decade earlier.

¹ We define depletion as the amount of operating capacity lost because of mine exhaustion and the decreased productivity of older mines that are still operating.

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Soviet data suggest that more than 80 percent of the output from new capacity now simply offsets mine depletion.

Investment in the Coal Industry

The slowdown in new mine development has resulted from inadequate investment in the coal industry. The coal industry's share of investment in the fossil-fuel industries fell from about 35 percent in the mid-1960s to about 18 percent in 1981. From the mid-1960s to the early 1980s, Soviet investment growth in the oil and gas industries outpaced investment growth in coal by a factor of six.

The sharp curtailment in the share of investment available to the coal industry reflects the outcome of energy policy debates during the 1970s when Soviet policymakers reviewed the coal industry's problems and examined the advantages of increasing oil and natural gas supplies to the economy. The advocates of oil and gas prevailed, arguing that the coal industry was not a reliable energy supplier because coal quality was declining and the energy return on investment was much less for coal than for oil and gas.

Attempts To Deal With the Labor Constraint

Shortages of labor and falling labor productivity have become increasingly serious at both underground and surface mines. The steady deterioration in the work environment, especially in the older coal basins, and the austere living conditions at newer basins in the eastern USSR have made it difficult to find enough miners, despite relatively high wages. To attract additional workers, the average workweek, which was 36 to 38 hours until 1976, has been cut to 30 hours. Shortening the workweek has not increased recruitment, however. Instead, it has forced mine managers to transfer manpower from maintenance to production activities. The mining enterprises are more likely to meet short-term output goals in this way, but failure to maintain equipment properly will eventually cut into production.

In 1982 Moscow raised the average wage for coal miners in five major basins by as much as 27 percent, with additional premiums for especially difficult conditions. However, the wage hikes appeared to have little to do with the upturn in output last year, since most of the coal production increase came from mines

not yet included in the pay boost. The wage increase is scheduled to be extended to all coal miners this year. Nonetheless, regional coal industry officials indicate that without additional steps to increase the availability and variety of consumer goods, the pay hike probably will do little to attract additional workers.

Continuing Technical Problems

Development of the large new basins east of the Urals, notably Ekibastuz and Kansk-Achinsk, is constrained by technical problems. Although the Soviets estimate reserves in these two basins to be large, totaling 120 billion tons, the quality is poor. Both low coal quality and distance from consumers make large-scale rail shipment from Ekibastuz and Kansk-Achinsk uneconomic. Realizing this, the Soviets are attempting to develop alternatives to rail transportation, new techniques for improving the quality of coal prior to shipment, and long-distance electricity transmission systems.

The Soviets are studying various types of pipeline coal shipment (slurry lines, capsule pipelines) as alternatives to rail transportation; but large-volume, long-distance transfers are beyond their current capabilities. Experience in operating slurry pipelines has been confined to two low-volume lines only 10 kilometers long. Conversion of the low-quality Kansk-Achinsk coal into upgraded products—semicoke, thermocoal, or synthetic liquid fuels—would make it transportable over long distances and usable in a variety of boilers. However, Soviet research on coal conversion processes appears to be stalled in the pilot-plant stage of development. Last year, Moscow intensified contacts with Western firms possessing technical expertise on slurry pipelines and coal conversion. Western assistance may help the Soviets better evaluate the long-term possibilities for these technologies, but immediate Western aid for major projects is unlikely given the considerable technical and financial hurdles.

To transmit electricity from mine-mouth power stations in Siberia to the western USSR, the Soviets would have to achieve research breakthroughs on a combustion system for Kansk-Achinsk coal and on an ultra-high-voltage power transmission system of 2,200

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to 2,500 kilovolts. Because there has been only slow progress in these areas since the early 1970s, production at the new coal basins is now largely confined to supplying regional needs. Major expansion of Ekibastuz and Kansk-Achinsk will be delayed until new technologies are ready for commercial use and necessary construction is funded by major investment.

Production Outlook

Coal production is slated to increase by 5 million tons, to 723 million tons, in 1983. The industry probably will not perform well enough to achieve this goal. Production will probably stagnate at about the 1982 level—a situation that does not augur well for the 1985 plan goal of 775 million tons. The 1981-85 plan calls for annual additions of 18.6 million tons to mining capacity. The Soviets expect that mine depletion will average 10.5 million tons per year over the same period. Both of these Soviet projections are overly optimistic: early indications suggest that depletions are running higher and additions of new capacity lower than foreseen in the plan.

Taking into account lagging production in older coal basins and less-than-hoped-for increases at basins in the eastern USSR, we estimate that annual Soviet coal production will be only 715-725 million tons by 1985. We expect that the Soviets will eventually accelerate yearly increases in the Ekibastuz output, raising total production to 735-760 million tons by 1990, with 745 million tons the most likely figure. Attaining even this level by 1990 will depend heavily on a significant increase in coal industry investment, particularly for the Ekibastuz Basin.

All of the gain in raw coal production through 1985, and most of the gain through 1990, however, will be offset by the continuing decline in the average energy content of the coal being mined. Consequently, coal's contribution to Soviet primary energy production will probably continue to decline from the 25-percent share posted in 1980 to 20 percent in 1990.

Impact of Coal Shortages

Tight supplies of coal will severely undercut Soviet plans to increase the use of coal in the production of electricity during the 1980s. Moreover, coking coal

production will become a major bottleneck, substantially limiting the possibility for gains in steel production. The production of electricity and steel accounts for about three-fifths of Soviet coal consumption.

The Soviets hope to replace oil as a fuel in electricity production by increasing the use of both coal and gas. Because coal production will lag, we believe they will have to boost gas consumption by more than the already sizable increase targeted for 1985 if power plant use of oil is to be reduced.

If the USSR tries to meet its planned 1985 crude steel production goal and also to meet the demand of all other consumers at or near the 1980 levels, including export commitments, it will need nearly 215 million tons of raw coking coal. But, given the declining production of coal at the Donets and Kuznetsk Basins, we estimate that Soviet production of raw coking coal will drop from about 178 million tons in 1980 to about 168 million tons in 1990. Thus the Soviets will have to choose among several alternatives. They could change the pattern of domestic allocations, trim their plans for steel production, substantially increase coking coal imports, or eliminate coking coal exports—or, more likely, adopt some combination of these options.

If the planned needs of the electric power and steel industries were fully met, the availability of coal for all other users in 1985 would be about 30 to 35 percent less than in 1980. This is clearly an unacceptable outcome in view of requirements for coal in high-priority sectors like nonferrous metals and petrochemicals. Accordingly, the Soviets probably would stretch out the construction of new coal-fired power plants to balance coal supply and demand.

Looked at another way, to meet the planned 1985 requirements of the electric power and steel industries and maintain allocations to all other users at the 1980 level (including exports), total coal production would have to increase to about 815 million tons of raw coal. This level of output appears to be beyond Soviet capabilities until well into the 1990s.



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Management of Soviet Energy Policy

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The success of Soviet energy policy depends in part on the effectiveness of the decisionmaking process. This process occurs within an essentially three-tiered hierarchy with responsibility for approval, formulation, and implementation of energy policy distributed among a wide range of institutions and individuals.

Andropov indicated his awareness of the critical importance of energy policy almost immediately on taking office when, at the Central Committee plenum in November 1982, he called for the establishment of new energy commissions in the Council of the Union and the Council of Nationalities—the two houses of the Soviet parliament—to monitor energy policy for the government. Since he became party leader, the public record indicates that the Politburo has at least twice taken up energy questions at its weekly meetings: it reviewed the long-term energy program of the USSR drafted by the Academy of Sciences and examined plans for the development of energy in the Far East.

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The Decisionmaking Hierarchy

Policy Approval. Final responsibility for determining Soviet energy policy lies with the Politburo, which integrates its directives on energy matters into broader issues of economic, foreign, and national security policy. Because the Soviet system funnels most decisions up to the top of the hierarchy, many of the Politburo's actions constitute pro forma ratification of operational decisions worked out at lower levels where technical expertise is greater. On the other hand the Politburo has the authority to unilaterally make changes in basic policy directions. The criteria for this type of policy-altering decision include not only economic efficiency but political considerations. The Politburo can then authorize drafting of decrees to implement its decisions and reallocate resources as needed.

Policy Formulation. The formulation of energy policy occurs primarily in the Secretariat of the Central Committee of the CPSU, the Presidium of the Council of Ministers, and the USSR State Planning Committee (Gosplan). These organizations provide the Politburo with information and advice, serve as high-level forums for review of alternate strategies, and resolve conflicts over allocation of resources. Like the Politburo, they are responsible for integrating the various aspects of energy policy into broader economic and political contexts.

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Because of the breadth of its responsibilities the Politburo depends on the expertise of those members whose functional and regional responsibilities require considerable involvement in energy matters. Among the most influential are Nikolay Tikhonov, Chairman of the Council of Ministers; Geydar Aliyev, First Deputy Chairman of the Council of Ministers and former party boss of the Azerbaijan Republic; Vladimir Dolgikh, party secretary and head of the Heavy Industry Department of the Central Committee; and Mikhail Solomentsev, Premier of the Russian Republic.

The Secretariat, supported particularly by the Heavy Industry Department, has responsibility for formulating and monitoring energy policy for the party. Although specific policy options probably originate in specialized government, academic, and scientific organs, they must be coordinated with the party apparatus before being presented for Politburo review. In addition to Dolgikh, newly appointed party secretary Nikolay Ryzhkov is probably involved in energy matters as part of his responsibilities for economic management.

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General Secretary Andropov's knowledge in energy policy is limited largely to information obtained during Politburo discussions over the past decade, although he may have become involved in assessing requirements for energy-related foreign technology during his tenure as head of the KGB. Nevertheless,

Within the Presidium of the Council of Ministers an Energy Commission has reportedly been set up to bring those members with a direct interest in energy

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problems into frequent consultation and to provide direction to energy policy. Its membership probably includes at least the ministers of the energy production industries and the energy-related machine-building and construction industries. The Commission apparently is headed by Veniamin Dymshits, the Deputy Chairman of the Council of Ministers with responsibility for energy. Deputy Chairman Guriy Marchuk, the Chairman of the State Committee for Science and Technology (GKNT), also has a special interest in energy policy. [redacted] the GKNT established a new Oil and Gas Industry Department in early 1983 headed by Victor Mishchevich, a former first deputy minister of the oil industry. They expected this department to exercise considerable influence over the Soviet oil and gas industries.

Although formally subordinate to the Council of Ministers, USSR Gosplan exerts a powerful, separate influence on the formulation of energy policy through its extensive involvement in setting plan targets and allocating resources. Gosplan negotiates these with the responsible ministries and Central Committee departments. [redacted]

[redacted] disputes between Gosplan and a ministry are usually resolved in favor of the former.

Gosplan has been headed since 1965 by Nikolay Baybakov, another Deputy Chairman of the Council of Ministers and a former oil minister, who probably is also a member of the Energy Commission. Major responsibility within Gosplan for energy policy appears to reside with Arkady Lalayants, Gosplan Deputy Chairman for Energy Affairs, and Vladimir Filanovskiy-Zenkov, chief of the Petroleum and Gas Industry Department. Gosplan's role in energy policy was theoretically enhanced with the creation in 1981 of an Interdepartmental Commission located in Tyumen', which was supposed to act as a project manager for development of the West Siberian oil and gas region by promoting cooperation across ministerial and regional boundaries. So far, its success has been limited by a lack of any genuine authority. [redacted]

Policy Implementation. Responsibility for the implementation of energy policy lies with several key ministries and other state organs (see table), which take the general plan targets set by Gosplan and disaggregate them in order to assign specific tasks to

Ministry-Level Organizations With Primary Responsibility for the Implementation of Energy Policy

| Organization | Responsibilities |
|--|--|
| Ministry of Geology | Locates new reserves of energy resources to support future production. |
| State Commission for Reserves | Confirms reserves estimates of the Ministry of Geology and approves field development and production plans. |
| Ministry of Petroleum Industry | Defines full extent of fields identified by the Ministry of Geology; proposes plans for field development including appropriate technology; designs and maintains facilities and equipment for extraction, initial processing, storage, and distribution of crude oil. |
| Ministry of Gas Industry | Similar to those of Oil Ministry but for gas. Also responsible since 1978 for offshore exploration and production of both oil and gas. |
| Ministry of Coal Industry | Similar to those of Oil Ministry but for coal, peat, and shale. Distribution handled by railroad ministry. |
| Ministry of Power and Electrification | Siting, design, construction, and, in most cases, operation of all types of electric power stations, and the distribution of electric power. |
| State Committee for Utilization of Atomic Power | Theoretical development of commercial nuclear power including breeder reactors. |
| Ministry of Construction of Oil and Gas Industry Enterprises | Primary contractor for construction of oil and gas field facilities and infrastructure and for laying of crude oil, natural gas, and product pipelines. |
| Ministry of Petroleum Refining and Petrochemical Industry | Primary and secondary processing of crude oil into various kinds of fuels, lubricants, and petrochemical feedstocks. |
| State Committee for the Supply of Petroleum Products | Planning and monitoring the distribution and economical use of petroleum products. |
| Ministry of Power Machine Building | Manufactures boilers, turbines, and generators for power production. |
| Ministry of Chemical and Petroleum Machine Building | Manufactures equipment for oil, gas, and petroleum refining industries. |
| Ministry of Foreign Trade | Negotiates and supervises contracts for the import and export of energy and for the purchase of energy-related foreign technology and equipment including turnkey plants. |

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operational units. Because of their extensive knowledge of technological, production, and distribution capabilities, ministerial assessments and recommendations constitute a significant input to the decision-making process, particularly to Gosplan [redacted]

The ministry-level policy perspective is narrow; each ministry is primarily concerned with setting and achieving its own production goals rather than with overall energy policy. This perspective tends to create problems because the operational interdependency among both the primary and support organizations—such as various transportation, construction, supply, and machine-building ministries—is great, whereas the degree of cooperation and coordination is often quite low. The frequent failure of one ministry to achieve plan targets or to fulfill contractual obligations has a ripple effect that forces continual adjustments in production schedules and encourages the kinds of inefficiencies—stockpiling of resources, duplication of effort, and underestimation of production capability—that Soviet decisionmakers want to eliminate. [redacted]

Decisionmaking Behavior

The decisionmaking process functions most of the time to confirm rather than alter the basic direction of established energy policy. In this environment decisionmakers:

- Proceed through a sequence of annual and five-year planning cycles in the usual Soviet style of incremental planning.
- Act as troubleshooters to resolve the nearly continuous stream of organizational conflicts over resource allocation and areas of responsibility.
- Become involved in administrative activities such as the development and introduction of new economic indicators and planning procedures, bureaucratic reorganization, and exhortation campaigns. [redacted]

For example, when the Ministry of Construction of Oil and Gas Industry Enterprises was apparently unable to meet its target for building access roads to Soviet oilfields a decision was made, probably by the Council of Ministers Presidium, to try to solve the problem by shifting responsibility for the roads to the Ministry of Transport Construction. So far, however, the most tangible effect of this shift is the concern expressed by an official of the latter ministry in late

1982 about the need to acquire the resources necessary to meet this new obligation. Energy decisionmakers have also been occupied recently with the introduction of new wholesale prices for energy and with the campaign for conservation of all energy resources, which has touched even the Ministry of Defense. [redacted]

Because in the Soviet system even minor decisions on these matters tend to rise through the hierarchy for review and ratification, decisionmakers at all levels are caught up in the management of the most mundane matters relating to energy policy. Soviet decisionmakers operating in this process are driven by the need to meet current production targets and constrained by a lack of flexibility. They thus lack a longer term perspective which might help them identify serious problems earlier. In addition, despite a high level of activity on the administrative front, decisionmakers remain tied to an economic system that is not very effective in fostering the type of innovative and economically efficient behavior that is most important for the successful implementation of Soviet energy policy for the 1980s. [redacted]

This more typical decisionmaking process occasionally can be interrupted by the top leadership in response to pressing problems that require a rapid reevaluation and redirection of energy policy. The leadership clearly demonstrated this ability in 1977 when it abruptly shifted the direction of energy policy in the middle of the 1976-80 five-year plan. At that time, the Politburo ordered a sharp reallocation of investment to West Siberia when it became apparent that planned investment was insufficient to meet oil production targets. It also sought to significantly alter the role oil and natural gas were to play in the Soviet energy balance over the next decade. More recently, the Politburo responded to the large increase in the Soviet hard currency balance-of-trade deficit by increasing exports of petroleum and petroleum products to the West, while simultaneously forcing several of its East European allies to absorb reductions in their imports from the USSR. [redacted]

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The capacity to mobilize and shift large amounts of resources rapidly is an important strength of the highly centralized and hierarchical Soviet decision-making system. Once the Politburo decides to change the direction of energy policy, the rest of the hierarchy is compelled to implement the decision, although some foot-dragging and lobbying for alternative options may occur. The decisionmaking process is weakened, however, by the fact that changes in policy can often be effected only in response to major problems rather than smoothly integrated within the normal decisionmaking process. [redacted]

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The outline of the new energy program, which, according to the Soviet official who provided it, has already been approved and will be announced shortly, does not appear to contain any major changes in energy policy. Yet, as suggested in several other articles in this issue, many of the targets of the program are already in jeopardy. Thus, it is likely that during the remainder of the decade the Soviets will face mounting energy problems that may again require major, sudden changes in energy policy. [redacted]

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These types of changes in policy cannot be made without paying a price. The Soviet leadership must carefully weigh the benefits of such changes against the potential economic and political disruptions they may cause. Moreover, this type of decisionmaking is inherently self-limiting because the more frequently such changes are required, the greater are the potential costs involved. This reduces the flexibility of the system to handle additional problems. [redacted]

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Other Topics

Development of Helicopter Squadrons in Soviet Ground Forces Divisions [redacted]

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The Soviets are rapidly upgrading the helicopter detachments in the ready divisions of their Ground Forces into larger, more potent direct-support squadrons [redacted]

They are not suitable—either in numbers or by type—to provide troop lift or fire support [redacted]

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[redacted] the Soviets began to experiment by adding to some of these detachments new types of helicopters which gave the division commander troop lift and aerial fire support over which he could exercise direct control. Aerial fire support came from the addition of MI-24 Hind D/E and MI-8 Hip E helicopters. The additional MI-8 Hips provided troop lift. The 18 to 20 helicopters in the expanded detachment—which then became a squadron—generally included six Hinds (D or E models) and six Hips (C, D, or G models) in addition to the six Hoplites and two Hips (C or D models) already present in the old detachment. This inventory is not standard throughout the force; variations in number and type of aircraft abound. Table 1 compares the makeup and capabilities of the helicopter detachment and the direct-support squadron. [redacted]

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[redacted] This program to provide division commanders with helicopter squadrons that they can control directly signals a major shift in the roles of helicopters in divisional operations. The addition of aerial firepower and troop lift directly responsive to the division's needs is part of a broad-based effort to make maneuver formations more balanced, self-sufficient, mobile, and powerful combined-arms forces. [redacted]

Evolution of Divisional Helicopter Units

[redacted]

[redacted] The typical detachment is equipped with six to eight MI-2 Hoplite and two MI-8 or MI-9 general purpose helicopters. These aircraft provide the division with aerial reconnaissance, fire-support targeting, command and control, communications relay, medical evacuation, and general logistics support.

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² The Soviets began to reorganize motorized rifle and tank divisions in the late 1970s. They added tanks, armored personnel carriers, and self-propelled artillery to the division's units to increase firepower, improve cross-country mobility, and achieve greater combined-arms cooperation at the regimental level. The conversion of the division's helicopter detachment to a direct-support squadron appears to be part of this combined-arms reconfiguration. [redacted]

¹ The Soviets define as "ready" those divisions which are highly manned, well trained, and fully equipped, and which are at least minimally prepared for combat operations with little or no mobilization. [redacted]

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Briefs

Long-Term

Energy Program

A Soviet economist recently told the US Embassy in Moscow that the USSR will soon announce a 20-year energy program calling for changes in energy policy involving goals beyond the mid-1980s. Some of the planned increase in investment in current oil production will be shifted to exploration for new deposits, and investment in coal production is to rise more rapidly. Future hard currency revenues will be obtained by raising gas exports and sustaining oil exports. To do this, the economist said, gas would increasingly be substituted for oil in domestic use and domestic allocations of oil might be cut before oil exports, even though this would slow economic growth.

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The energy program is one of several new long-term efforts the Soviets are making to focus resources on major problem areas. Program goals and investment priorities appear to be more practical than previous ones. The program will be difficult to carry out, however, because of growing competition for investment resources. In addition, planners are unlikely to make large cuts in domestic oil allocations without a reduction in exports.

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Increase in Economic Aid to Cuba

Cuba has announced that the USSR increased its economic aid by 20 percent last year and will increase it further this year, but the Soviets reportedly are demanding that Havana improve its management of the economy.
 Moscow has been urging that improvements be made in sugar production and oil conservation.

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The Soviets will continue to urge Cuba to manage its economy better to limit the amount of aid they have to provide. In dollar terms, Soviet economic and military aid appears to have tripled over the past eight years as a result of falling world sugar prices, increased oil prices, and the modernization of the Cuban armed forces. The USSR is short of sugar and is asking Cuba to provide 4 million tons this year. This probably is more than Havana can deliver from the weather-damaged crop without jeopardizing its earnings from selling sugar to the West. The USSR presumably considers the economic aid—and the estimated \$590 million in military aid last year—to be worthwhile in view of Cuba's role in Central America, the Caribbean, and Africa.

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Soviet Military Personnel in Lebanon [redacted]

Soviet military personnel apparently are stationed with Syrian forces in Lebanon. Last month the Soviets reportedly were operating Syrian Army mobile radar equipment in the Bekaa Valley. [redacted] a few Soviets have been working near a village just west of the Bekaa Valley for some time. [redacted]

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Moscow's willingness at this time to station some Soviet personnel in Lebanon presumably is part of the USSR's program to strengthen Syria's defenses. Before the crisis last summer in Lebanon, a few Soviet technicians stationed in Syria reportedly went into Lebanon only during the daytime to maintain the Syrian SAM sites there. The Soviet personnel now in Lebanon may be helping the Syrians set up and coordinate early warning radars tied to the net in Syria. They also may be operating electronics or communications equipment. [redacted]

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Soviets May Further Restrict Jewish Emigration [redacted]

The US Embassy reports judicial employees in Moscow early this month received a background briefing on an apparent decision to halt the emigration of all but a handful of Jews from the USSR and to give those who remain easier access to higher education and better jobs. New administrative procedures have made emigration by all Soviet citizens more difficult this year, and the rate of Jewish emigration—already low since 1979—currently is about half that of last year. Meanwhile, the creation of an Anti-Zionist Committee headed by prominent Soviet Jews has been announced. [redacted]

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The decision to further restrict emigration and the creation of the committee probably are aimed primarily at cutting the foreign ties of the Soviet Jewish community. Easing Jewish assimilation would be a logical next step, but this also would be a major reversal of past practices. [redacted]

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Kadar's Views on Andropov, Relations With the USSR [redacted]

In late April Hungarian Party First Secretary Janos Kadar held a lengthy talk with the US Ambassador in which he discussed his relations with Soviet party boss Yuriy Andropov. Kadar was reportedly embarrassed by Western speculation on his close ties to Andropov, but admitted they had known each other well since the mid-1950s. Kadar portrayed Andropov as more rational and formidable than his predecessors, remarking "If you are looking for an opponent, Andropov will be awesome, but if you are looking for a partner, he will be reasonable." [redacted]

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Kadar admitted that the Soviets exert significant control over their East European allies, but argued that the extent of control is overestimated in the West. He acknowledged overwhelming Soviet involvement in military matters and implied that in a crisis the Soviet General Staff would control non-Soviet Warsaw Pact forces directly rather than through the national command structures. Foreign policy coordination is also close, though Kadar maintained that individual countries have considerable freedom to go their own way on issues not vital to Moscow. He said the allies have the most latitude in the economic sphere. In the summer of 1980—when strikes broke out in Poland over price increases—President Brezhnev gave the Hungarians the go-ahead on price hikes by asserting "You know what you're doing." [redacted]

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Hard Line on Economic Reform

Shortly before Brezhnev's death, the party's historical journal (*Voprosy Istorii KPSS*) reviewed a collection of documents relating to the crushing of the Czech reform movement in 1968. The review, written by A. M. Rumyanstev—a onetime reputed "liberal"—took a hard line in dealing with ideological deviation and economic reform and was clearly relevant to Poland. It stressed that vigilance must be maintained, revisionist elements within the party checked, opposition groups repressed, and party hegemony maintained. Economic decentralization was scored as an attempt to restore capitalism, and the reformist ideas of Czech economist Ota Sik were castigated

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The review is noteworthy considering the positive attention given East European economic reform in the Soviet media over the last year and the relatively upbeat treatment of Polish issues in the press. Soviet ideologists, in this case a former favorite of moderate party circles, continue to castigate reform, pluralism, and revisionism and obviously remain concerned about East European stability

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Soviet Views on El Salvador

Moscow apparently is not optimistic about the insurgents' immediate prospects in El Salvador but believes they could succeed over the long term. the leadership believes the current level of US assistance to the Salvadoran Government is enough to prevent a guerrilla victory. At the same time, however, the Soviets are confident that the US Congress will not approve the military aid and advisers needed to quell the insurgency.

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Moscow may believe that a lengthy military stalemate will further complicate the US administration's efforts to win Congressional and public support for its Central American policy. If the United States decides eventually to put pressure on San Salvador to negotiate with the insurgents, the Soviets probably hope the insurgents—particularly the Salvadoran Communists—will be able to exploit any government overtures.

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NC Machine Tool Production

A CIA study ¹ shows that in the current five-year plan the USSR continues to emphasize the production of numerically controlled (NC) machine tools to help increase industrial productivity and to modernize its defense industry. But the USSR has lagged badly in moving from early-vintage NC machine tools to advanced types now common in the West. Thus, although Soviet annual NC machine tool output of about 10,000 units equals that of the United States, advanced computer-operated multiaxis machines make up only 4 percent of total Soviet production, compared with 56 percent of the US total.

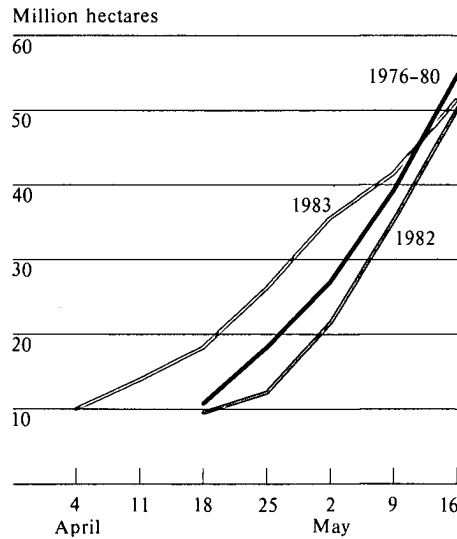
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To help compensate for the slow progress in advanced machine tools, the USSR has resorted to large-scale imports. For some models—machining centers, for example—imports even exceed domestic production. Much of the imported equipment has been allocated to the defense sector. Known applications include production of aircraft, missiles, tanks, trucks, and ship propellers.

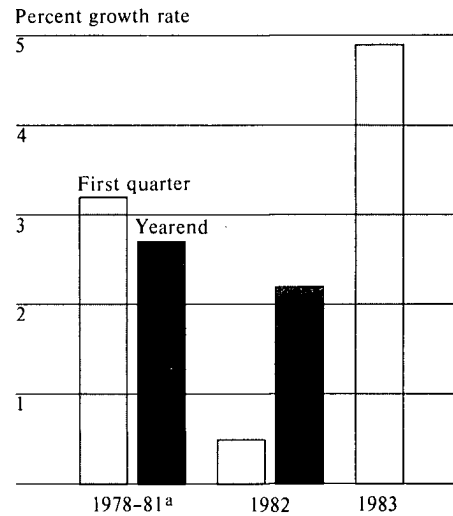
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USSR: Pace of Spring Grain Sowing



USSR: First-Quarter and Annual Industrial Growth, 1978-83



^a Average annual rate of growth.

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Good Start for Spring Grains

The spring grain crop in the USSR (about two-thirds of total grain production) is off to one of its best starts ever. By the end of April, the amount of grain planted was nearly double that of a year ago and second only to the 1975 record.

initial plant development in the southern European USSR is good to excellent.

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The pace of sowing has slowed considerably during the past two weeks because planting was drawing to a close in the European USSR and, as usual, had not yet begun in the main spring wheat areas east of the Ural Mountains. Nevertheless, if Soviet farmers maintain a normal tempo of fieldwork for the next few weeks, nationwide sowing targets should be easily fulfilled. More importantly, completion of planting ahead of schedule in the west has increased the likelihood that most plants there will flower before the summer's hottest weather. Unusually hot, dry weather at flowering—the time when maximum potential grain yields are determined—often causes plant sterility and reduced yields. Early planting also reduces the vulnerability of ripened grain to frost damage in the fall.

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With an estimated 61 million hectares of spring grains still to be planted, it will be weeks before a definitive forecast of 1983 Soviet grain production can be made. Nevertheless, Moscow's target of 238 million tons already appears well out of reach because of current prospects for a below-average harvest of winter grains. A bumper crop of perhaps 220 million tons is still possible, however, if excellent weather prevails through the end of the crop season in early October.

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**First-Quarter
Industrial Growth**

Soviet industrial output in the first quarter of this year was up nearly 5 percent over the corresponding period in 1982. This is well above the increase of less than 1 percent during the first quarter of last year and exceeds the 3.2-percent growth rate planned for all of 1983. Output in civilian machinery grew by over 6 percent, and construction materials increased by nearly 5 percent. The pivotal ferrous metals industry, beset with serious problems in recent years, showed a gain of 3 percent compared with a decline of almost 3 percent in the first quarter of 1982.

For the most part, the steep production increase is a reflection of the poor achievement during the first quarter of last year. The average first-quarter growth rate for the two-year period 1981-83 was 2.7 percent. Although the growth rate will probably decrease during the remainder of the year when compared to the balance of 1982, this year's industrial growth will probably be higher than the 2.2-percent increase last year.

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Viewpoint

The following article presents the Defense Intelligence Agency's assessment of the prospects for Soviet oil production in the 1980s.

Outlook for Soviet Oil: A DIA Assessment

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By the late 1980s Soviet oil production is expected to stabilize at about 12.6 million barrels per day, assuring a surplus for the attainment of hard currency objectives. The continued role of oil as an important hard currency earner reflects prudent Soviet planning, which emphasizes long-term policies of fuel substitution, conservation, and continued growth of secondary refining capacity. Such policies will provide substantial quantities of crude oil and the more valuable petroleum products for export.

The leadership will continue to view oil as the cornerstone of a broad strategy for the exploitation of the Soviet Union's abundant energy resources. These include the second-largest proved oil reserves in the world and geologic structures in West Siberia that have excellent potential for developing future reserves. Furthermore, this huge hydrocarbon resource base is supported by the world's largest reserves of natural gas and probably the largest reserves of coal as well as a highly successful electric power industry, which ranks second in the world in hydroelectric potential and is a major producer of nuclear power.

The general direction of Soviet energy development and of growth and change in the petroleum sector is clearly indicated in the USSR's current capabilities and performance to date. While the specific course of future petroleum-related programs cannot be precisely determined, it is likely to reflect the benefits of long-range integrated development of a massive resource base. Thus, assessments of prospects for exploration, production, processing, and transport reflect the continuity of long-range planning and the flexibility permitted by a range of energy development choices affecting the petroleum sector.

Exploration

At the present rate, drilling in West Siberia should be approaching 20 million meters per year by 1985. The total number of additional development wells planned for the 11th Five-Year Plan (1981-85) is about 23,700. By the end of 1983, over 13,000 wells will have been drilled, leaving only some 10,000 to be drilled by the end of the current plan. This appears to be achievable since the 1983 rate of well completion will probably exceed 5,000.

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By the end of the 1986-90 plan period, West Siberian drilling should total more than 100 million meters. This drilling capability should permit the USSR to reach a production of 10 million b/d from West Siberia by 1990. Beyond 1990, there is the possibility of finding and developing many new oil deposits in West Siberia, since relatively little of that vast area has been fully explored.

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Production

Soviet oil production will continue to grow through 1985, though at a rate of less than 1 percent annually, and then level off pending installation of the necessary additional infrastructure. This is likely for the following reasons:

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- Proved, recoverable oil reserves are large enough to support the expected 1985 production level through 1990.
- The increase in the number of drilling brigades in West Siberia, targeted at 450 by 1985, assures that drilling goals in the region can be reached.

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In addition, the rapid, ongoing expansion of the West Siberian pipeline system is a good indication of Soviet confidence that additional, exploitable oil reserves are to be developed. West Siberian production should reach 7.4 million b/d by 1984 and eventually should reach 10 million b/d following construction of a new large-diameter pipeline from the area, now reportedly under way. Furthermore, production outside of West Siberia is not expected to fall below 2.5 million b/d in the same time frame. Thus, the USSR will be able to maintain a production level of at least 12.5 million b/d through 1990. [redacted]

After 1990, with enough additional equipment, manpower, and pipelines in place in West Siberia, Soviet oil production could again show growth if officials perceive that it would be to the USSR's benefit to raise production. Worldwide demand and price at that time will be determining factors. [redacted]

Processing

A trend away from maximizing the production of fuel oils is now beginning and should be well under way by the late 1980s. Changes in the product mix at the refineries probably will reflect the increased demands for both high-octane gasolines and quality, low-sulfur diesel fuels. Major boosts in the output of these products will be needed if: (a) the increase in the inventory of motor vehicles continues at present rates, and (b) the average mileage per passenger car increases as the result of a major program for upgrading and expanding the highway system. [redacted]

The emphasis on output of quality motor vehicle fuels is consistent with the expected lowering of demand for fuel oils as natural gas and other fuels are substituted. Moreover, an increase in overall secondary refining capability affords the prospect of producing greater amounts of higher valued petroleum products for export. [redacted]

Transport

Future trends in the movement of crude oil will continue to reflect those of the past decade, concentrating upon the movement of oil by pipeline from West Siberia to various refining centers. Since an extensive system is already operational, most new construction, other than additional pipelines from

West Siberia, will probably be limited to the modernization of the existing system for more centralized, automated control. [redacted]

The principal increase in oil pipeline construction is likely to involve expansion and extension of the petroleum products delivery system. Military fuel pipelines, which are already extensive, will probably be extended and improved. [redacted]

During the present five-year plan period, an additional 10,000 kilometers of new oil-products pipeline are planned for construction. As a result, the movement of products by rail should continue its slow decline over the next several years, with an attendant reduction in the current "bottlenecks" associated with the less reliable rail transportation network. [redacted]

Conclusions

The oil industry's development is likely to continue to reflect pragmatic choices of the leadership in exploiting energy resources according to a long-term perspective. Knowledge of the extent and availability of these vast energy resources and the consistent performance of this industry have given the senior party and government officials the confidence with which to make prudent choices in controlling future energy developments. [redacted]

Effects of Consumption Trends, Exports, and Fuel Substitution.

In 1982 oil production in the Soviet Union was 12.2 million b/d (613 million tons), while estimated internal consumption was 9.2 million b/d. The remainder constituted exports to Eastern Europe and other client states and the Free World, with the latter receiving between 1.4 and 1.5 million b/d of crude and products. [redacted]

The USSR has recently reduced oil exports to Eastern Europe by about 10 percent, apparently because of its perception that further conservation measures can be adopted in the East European economies and because of the need to export additional oil to the West for hard currency. Despite reduced Soviet deliveries, the East European countries increased their net petroleum product exports to OECD countries from 7.35 million tons (147,000 b/d) in 1981 to an estimated 8.0 million tons (160,000 b/d) in 1982. [redacted]

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Soviet petroleum exports to the West are probably balanced to achieve hard currency earnings and to exploit opportunities within the world oil market. While there are indications that the USSR could increase its oil deliveries, it apparently is seeking to maintain high oil prices by adhering to an export level that will not disturb the market. [redacted]

Major domestic consumers of oil include the electric power and heat generation sectors, which in 1980 accounted for over 3.8 million b/d (43 percent) of Soviet oil consumption. An upward trend has now been reversed, and the use of oil for these purposes in 1982 was 3.67 million b/d. This decline is expected to continue through 1995, when generation of power and heat will be using over 3.0 million b/d, a drop of around 700,000 b/d from the 1980 rate, reflecting the increasing use of natural gas and coal in lieu of oil. Offsetting this decline in oil consumption is the targeted increase in usage of other fuels, with gas increasing in these sectors from more than 165 billion m³ in 1980 to over 282 billion m³ in 1985. Large increases in the share of nonoil fuels beyond 1985 are expected to occur. [redacted]

With the reduction in oil consumption that will occur through conservation and substitution, it is estimated that Soviet oil exports could range between 3.5 and 3.75 million b/d in 1990. [redacted]

Economic Considerations. In the energy sector, natural gas is rapidly becoming a major export and hard currency earner. However, initial deliveries from the Urengoy-Uzghorod gas pipeline to Western Europe will not commence until 1984, and much of the projected increase in exports will not take place before 1990. Therefore, oil sales will continue to be the USSR's primary source of hard currency earnings through 1990. [redacted]

The petroleum industry is crucial to the Soviet economy, and the rapidly increasing capital investments in this sector represent a recognition of its great importance. The current production of over 12 million b/d is valued at between \$130 billion and \$140 billion annually at free market prices. Returns of this magnitude for a relatively small investment make resource commitment to the petroleum industry a logical choice and a major priority. [redacted]

In the current five-year plan (1981-85), the petroleum industry and associated infrastructure development account for a large portion of expenditures in the energy sector, which received a much higher proportionate increase in capital investment than any other sector of the Soviet economy when compared with the 10th Five-Year Plan. (The growth in energy investment was five times the rate of the USSR's total capital investment increase.) [redacted]

The Role of Oil. The Soviet energy sector as a whole is not without its deficiencies and constraints. For example, the nuclear power program is considerably behind schedule, coal production continues to be slow, occasional shortages occur in some petroleum products, and rail transport bottlenecks are chronic, even affecting deliveries to some defense-related industries. However, the petroleum industry is well planned, tightly controlled, and relatively efficient. As far as can be determined, the oil sector has performed according to the leadership's expectations as part of the overall plan to assure energy self-sufficiency and to meet national energy goals. [redacted]

Furthermore, it is likely that the USSR fully appreciates the versatility of oil as an efficient energy source for heating and power generation, a vital feedstock for key industries, and an indispensable fuel for military use. Such important applications, taken together with the value of crude oil and petroleum products as a flexible instrument in foreign commerce, explain the prime consideration oil has received in long-term development decisions. [redacted]

The outlook for oil exploration, production, processing, distribution, and consumption reflects the unique flexibility of petroleum usage as a priority fuel and as a feedstock. The USSR's energy future also envisions an expanded role for natural gas and electric power in domestic and foreign consumption and for coal as an eventual substitute for both oil and natural gas in heating and power generation. [redacted]

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Accordingly, the leadership will regulate the production of oil to achieve balanced energy use of natural gas, coal, electric power, and petroleum over the long term to satisfy planned domestic consumption and export requirements in a pragmatic, cost-effective manner.

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