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Outlook for the Siberia-to-Western Europe Natural Gas Pipeline

An Intelligence Assessment

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An Intelligence Assessment

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Outlook for the Siberia-to-Western Europe Natural Gas Pipeline

Key Judgments

We believe that the USSR will succeed in meeting its gas delivery commitments to Western Europe through the 1980s. Moscow has a wide range of options to accomplish this end:

- Deliveries could begin in late 1984, as scheduled, by using existing pipelines, which have excess capacity of at least 6 billion cubic meters (m³) annually.
- Using some combination of Soviet and West European equipment, deliveries through the new export pipeline could probably begin in late 1985 and reach nearly full volume in 1987—about one year later than if the sanctions had not been imposed.
- At substantial cost to the domestic economy, the USSR could divert construction crews and compressor-station equipment from new domestic pipelines to the export pipeline or even dedicate a domestic pipeline for export use to ensure capacity adequate to meet contractual delivery obligations.

The task confronting the Soviets is made easier by the nonlinear relation between compressor power requirements and gas throughput in pipeline operations. By obtaining the 20 or so turbines built with the GE-made rotors already in Western Europe and operating compressor stations without standby units, Moscow could deliver through the new pipeline about three-fifths of the planned annual throughput of nearly 30 billion m³. Turbines using an additional 40 rotors—the number Alsthom-Atlantique contracted before the US embargo to build for the Soviet Union under GE license—could boost throughput to nearly 90 percent of capacity. For reliability of pipeline operation and periodic maintenance, however, the Soviets would probably use some of the available turbines as standby units, thereby limiting throughput to about three-quarters of capacity.

Completion of the pipeline has become a top-priority objective for the Soviet leadership. On the economic side, they look forward to some \$5 billion a year in new hard currency earnings from gas in the early 1990s (after repayment of pipeline borrowing) to partially offset declining oil export revenues. In their view, moreover, the United States' imposition of

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sanctions has made completion of the pipeline a matter of national prestige and has provided an opportunity to foment dissension in the Western alliance.

The West Europeans see Soviet gas as a relatively low-priced substitute for uncertain Middle Eastern oil and also view the Soviet pipeline equipment orders as easing their substantial unemployment problems. In addition, they hold that increased East-West economic interdependence will lead to more responsible Soviet behavior. They are deeply angry about the US decision, especially the extraterritorial and retroactive features of the measures, which they regard as a serious infringement of their sovereignty.

As a result, the West Europeans are seeking ways to defeat or circumvent the extended US sanctions. Paris has ordered French firms to honor their Soviet contracts, and [

] Rome has said that pipeline contracts will be honored but has not yet ordered Italian firms to do so.

Taking all this into account, we think the likely Soviet choices for completing the export pipeline—in descending order of probability—are:

- Shipment of completed turbines built with the 20 or so GE rotors already in Western Europe.
- Production of the 40 GE-designed rotors by the French firm Alsthom-Atlantique under its existing contract with the Soviets—the move already announced by Paris.
- Production by Alsthom-Atlantique of 60 additional GE rotor sets, to be supplied to the West European turbine manufacturers.
- Western assistance in manufacturing rotors for Soviet-designed megawatt turbines.
- Soviet redesign of pipeline compressor stations, substituting a combination of smaller turbines or other drivers of either foreign or Soviet design.

Only the last outcome—primary reliance on their own resources—would cause the USSR much difficulty. The costs to them will be much higher if they have to build their own gas turbines and compressors for the export pipeline. Specifically, diverting from the domestic pipeline program Soviet equipment sufficient to equip the export line could reduce gas delivery to the domestic economy by as much as 30 billion m³ annually for a year or two. Other Soviet equipment options would have considerably smaller impact on domestic gas supply.

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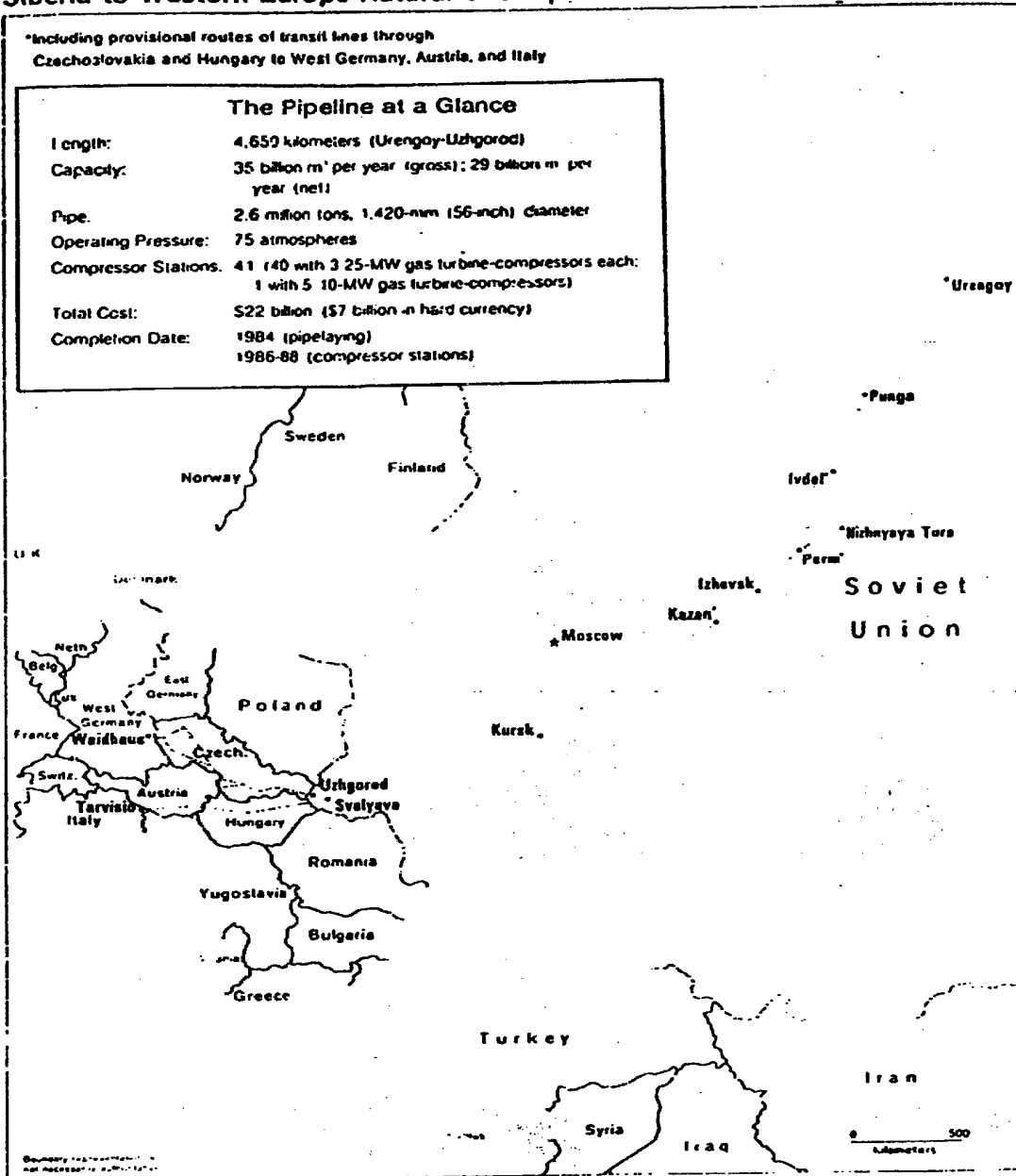
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Siberia-to-Western Europe Natural Gas Pipeline*

Figure 1

*Including provisional routes of transit lines through Czechoslovakia and Hungary to West Germany, Austria, and Italy

The Pipeline at a Glance	
Length:	4,650 kilometers (Urengoy-Uzhgorod)
Capacity:	35 billion m ³ per year (gross); 29 billion m ³ per year (net)
Pipe:	2.6 million tons, 1,420-mm (56-inch) diameter
Operating Pressure:	75 atmospheres
Compressor Stations:	41 (40 with 3 25-MW gas turbine-compressors each; 1 with 5 10-MW gas turbine-compressors)
Total Cost:	\$22 billion (\$7 billion in hard currency)
Completion Date:	1984 (pipelaying) 1986-88 (compressor stations)



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Outlook for the Siberia-to-Western Europe Natural Gas Pipeline (U)

Background

The Siberia-to-Western Europe natural gas pipeline is the largest East-West trade project to date (see thumbnail description in figure 1). Under negotiation since 1979, the pipeline has a planned gross capacity of 35 billion cubic meters annually and could deliver nearly 30 billion m³ to West Germany, France, Italy, Austria, and other countries for 25 years. Gas purchase agreements were signed in late 1981 with West German and French utilities and in June 1982 with Austria's Ferngas. Initial exports of 3 to 5 billion m³ per year are to start in 1984, and full deliveries are scheduled to begin in 1987.

The USSR will be able to use a combination of the existing Soyuz export pipeline, domestic trunklines, and East European transit lines to begin initial deliveries in late 1984 or to supplement the initial throughput of the export pipeline. With the phasing-in of the new gas export pipeline, total Soviet gas deliveries to Western Europe—under older contracts as well as the new export pipeline contracts—could reach about 42 billion m³ in 1985 and then rise to as much as 54 billion m³ in 1987 (see table 1).¹ Annual gas deliveries to Eastern Europe would increase by several billion m³ if 10 percent of the projected Soviet exports are delivered to Czechoslovakia and Hungary as transit fees.

Western Europe remains the primary market for additional Soviet natural gas exports. Although gas demand has softened in recent years, it is expected to bottom out this year and revive as economic recovery begins. Total West European gas demand is expected to grow from about 215 billion m³ in 1980 to 245 billion m³ in 1990, and perhaps to 270 to 300 billion m³ by the year 2000. The Soviets are anxious to increase gas exports to Western Europe. With the completion of the export pipeline, deliveries would

¹ The information available on the deliveries under the new contracts is still extremely sketchy, so the timing depicted in table 1 should be considered a rough estimate of the delivery profile.

Table 1

Billion cubic meters

Soviet Gas Deliveries to Western Europe^a

	1980	1984	1985	1987
Austria:	2.4	2.8	3.4	4.0
Existing contracts	2.4	2.5	2.5	2.5
New contracts		0.3	0.9	1.5
France:	4.0	5.7	9.0	12.6
Existing contracts	4.0	4.2	4.2	4.2
New contracts		1.5	4.8	8.4
Italy: ^b	7.0	8.4	11.6	15.0
Existing contracts	7.0	7.0	7.0	7.0
New contracts		1.4	4.6	8.0
West Germany: ^c	10.9	13.9	18.1	22.5
Existing contracts	10.9	12.0	12.0	12.0
New contracts		1.9	6.1	10.5
Total:	24.3	30.8	42.1	54.1
Existing contracts	24.3	25.7	25.7	25.7
New contracts	—	5.1	16.4	28.4

^a Excluding Finland; amounts of annual offtake under the new contracts are subject to reduction by up to 20 percent under scheduled semiannual negotiations with the Soviets.
^b Italy has not yet signed the new purchase contract.
^c Excluding potential deliveries of 0.8 billion m³ to West Berlin

more than double by 1990, compared with the present level. At that time, West European countries could be relying on Soviet gas for nearly one-fourth of their gas requirements. Unless Western alternatives to Soviet gas are developed, the USSR could capture an even larger share of the West European gas market in the 1990s

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Table 2

Major Western Suppliers for Compressor-Station Equipment

General contractors for compressor stations	Mannesmann-Creusot-Loire (22 stations—\$940 million)	Nuovo Pignone (19 stations—\$560 million)
Subcontractors for:		
Head station (1)		
Gas turbines—Frame III 10-MW	AEG-Kanis* (5 turbines)	
Gasline compressors	Demag (5 turbines)	
Line stations (40)		
Gas turbines—Frame V 25-MW	AEG-Kanis* (42 turbines) John Brown* (21 turbines)	Nuovo Pignone* (57 turbines)
Gasline compressors	Creusot-Loire (42 compressors) Dresser-France (21 compressors)	Nuovo Pignone* (57 compressors)
Frame V turbine rotor sets	General Electric (63 rotor sets)	General Electric (57 rotor sets)
Computer system for central control of export pipeline	Thomson/CSF	Thomson/CSF
Soviet order (Nov. 1981) for 40 Frame V rotor sets (end use uncertain)	Alsthom-Atlantique*	Alsthom-Atlantique*

* Indicates GE manufacturing associate.

While most of the new large-diameter lines being built in the Soviet Union will depend on domestically produced compressor-station equipment of less than optimum reliability and efficiency, the export line was planned to have a first-rate array of Western equipment. The added reliability of the system would benefit the Western purchasers of Soviet gas, and the supply of equipment financed by Western credits would reduce the investment burden on the Soviet economy.

The pipe and major equipment for the project have been ordered from a variety of Western companies. Large-diameter pipe contracts have been signed with Mannesmann (West Germany); Nippon Steel, Sumitomo, Nippon Kokan, and Kawasaki (Japan); Valloirec (France); and Italsider (Italy). The general contract for equipping compressor stations on the eastern portion of the pipeline is held by the German-French Mannesmann-Creusot-Loire consortium; the general contract for stations on the western portion is

held by Italy's Nuovo Pignone (see table 2). Compressor-station equipment, principally the gasline compressors and associated 25-MW industrial gas turbines, is to be provided by the West German firms AEG-Kanis and Demag; the French companies Creusot-Loire and Dresser-France (Alsthom-Atlantique is to supply gas turbine rotor sets to the Soviets on a separate contract); John Brown Engineering (UK); and Nuovo Pignone (Italy). Other British, French, Italian, and Japanese firms will supply ancillary communications and computer control equipment, valves, internal pipeline scrapers (pigs), and spare parts. Construction equipment—large pipelayers, bulldozers, cranes, and dredgers—will be made by Japanese, Austrian, West German, and Dutch companies.

Deliveries of gas to Western Europe under the new supply contracts can begin in late 1984 using excess capacity in existing pipelines transiting Czechoslovakia. As the volume of deliveries increases, however,

new transit pipeline capacity will be necessary. Some reports indicate one new transit pipeline will probably pass through Czechoslovakia to Waidhaus, West Germany, possibly with a branch through Baumgarten, Austria, to Italy. Other reports, however, suggest that Hungary will build the branch to Italy. Whichever decision is taken as to the route, a transit pipeline to cover the distance of roughly 800 km from the Soviet border to Waidhaus, West Germany, or Tarvisio, Italy, could be completed well before the added capacity is needed.

If the Soviets want to provide transit capacity for future expansion of their gas export pipeline system, they could press Czechoslovakia to build a 1,420-mm (56-inch) line to Waidhaus and ask Hungary to build a 1,420-mm line to Tarvisio. Compressor-station power could be supplied by GE-design Frame V 25-MW gas turbines or by any of a wide selection of smaller equipment, including 12-MW or 16-MW electric motors. A number of Japanese and West European manufacturers of turbines, electric motors, and compressors appropriate for gas transmission service have been actively seeking contracts from Czechoslovakia and Hungary.

The Export Pipeline's Place in Soviet Pipeline Plans

The gas export pipeline project dominates Soviet energy export plans for the 1980s and will have a strong influence on the gas industry's pace of development. But the Siberia-to-Western Europe pipeline is only one of six 1,420-mm gas pipelines that the Soviets hope to complete in the current Five-Year Plan (1981-85).² Two of the five domestic lines have already been laid. In addition to the export pipeline, Moscow hopes to lay by 1985 three more lines from the Urengoy gasfield to the European USSR, each 3,000 to 4,000 km long. The six new 1,420-mm trunklines from West Siberia account for roughly

²The new pipelines being constructed represent a major extension of the Soviet gas transmission system, which has grown rapidly, from only 5,000 km in 1955 to 132,000 km in 1980. A large share of the network transits territory where physical and environmental conditions are harsh and the infrastructural base is sparse. The major gas pipeline corridors of the USSR link the gas-rich regions of West Siberia, Central Asia, the Ukraine, and the southern Urals with the industrial centers west of the Urals.

one-half of the total of 48,000 km of gas pipelines planned for construction in 1981-85.

By the end of 1980, about 17,000 km of the Soviet gas transmission pipeline system consisted of imported 1,420-mm pipe. The Soviet Union has not succeeded in mass producing 1,420-mm pipe of high quality and strength for gasline service at 75 atmospheres. Much of the pipeline system operates at lower pressures and, consequently, the throughput is below the maximum attainable. In addition, because of shortages of appropriate equipment, Soviet pipelines often operate for extended periods with only a part of the designed compressor capacity installed. Running below capacity entails added costs per unit of gas delivered. Such costs might not be acceptable in Western market economies, but the Soviets are inured to the added burden of second-best solutions. Moscow plans to increase pipeline deliveries of gas by almost half from 1980 to 1985 despite prospective equipment shortages.

Importance of the Project for the USSR and Western Europe

The USSR

Moscow wants the gas export project for three basic reasons. Most important, the pipeline will earn badly needed hard currency and aid development of the Soviet gas industry. These objectives are increasingly important to the troubled Soviet and East European economies. At the same time, the USSR sees the project as a major step toward expanding its commercial and political ties with Western Europe at US expense.

Hard Currency Earnings. The pipeline is vital to Moscow's prospects for earning sufficient hard currency beyond the mid-1980s to avoid a major drop in its import capacity. Oil export revenues will probably fall substantially by 1985, and gas exports—under the export pipeline deal and preexisting contracts—will pick up much of the slack. Revenues from the pipeline

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deal alone should reach \$5 billion (in 1981 dollars) annually in the early 1990s when all credits are repaid, and total gas earnings (including existing contracts) could be roughly \$10 billion. The pipeline thus will support Moscow's purchases of Western goods and technology, which will be increasingly important to improving industrial productivity and to reducing agricultural shortfalls. The earnings from export deliveries of gas will also help the Soviets to maintain economic support to Eastern Europe, support that is now threatened by the hard currency crunch and domestic requirements.

Aid to Gas Production. Moscow almost certainly hopes that the pipeline project will establish reliable non-US sources of equipment for developing Siberian gas production, the key to Soviet energy plans through 1990. Gas output will provide almost all the growth in Soviet primary energy production and will be an increasingly important source of Soviet energy supplies to Eastern Europe. Because Western pipeline equipment will be critical to meeting plans for rapid gas production growth, the Soviets are now seeking to establish secure, non-US sources of supply—particularly for turbines, the technology most vulnerable to US sanctions. Moscow may see the turbine orders for the export pipeline as leading to further contracts, with the West Europeans possibly participating in the manufacture of a turbine of Soviet design. The Soviets, at the least, expect the current deal to sustain West European business interest in future gas-for-equipment agreements.

An assured non-US source of supply for pipelayers capable of handling 1,420-mm pipe is a critical consideration bearing on completion of the large pipelines planned. Because of the embargo on US equipment, the Soviets are obtaining large numbers of pipelayers from a Japanese manufacturer, Komatsu. The Komatsu deliveries, together with the pipelayers and associated equipment already in the USSR, appear to ensure that there will be no large imbalance in availability between pipelayers and large-diameter pipe in the next year or so.

Political Objectives. The Soviets almost certainly view the pipeline project as a means of increasing divisions between Western Europe and the United States, and the embargo has enhanced Moscow's ability to pursue that goal. The USSR probably believes that the West Europeans' increased dependence on Soviet gas deliveries by the late 1980s will become a permanent factor in their decisionmaking on East-West issues. In the past, the Soviets have used West European interest in expanding East-West commerce to undercut US sanctions, and they believe a successful pipeline deal will reduce future European willingness to support a US disruption of East-West trade.

West European Interests

The West Europeans have several reasons for wanting the gas export pipeline, including diversification of energy sources, pipeline-related export contracts, the relatively low price of Soviet gas, and the hope that economic ties will contribute to detente.

Diversification of Energy Sources. The West Europeans' prime reason for wanting the pipeline is to reduce their dependence on OPEC oil. Although that dependence has fallen substantially since 1973, Western Europe still imports more than half of its total energy requirements, and the bulk of those imports come from OPEC. Soviet gas, by contrast, would cover only about 3 percent of total energy needs once the pipeline is completed. Moreover, the West Europeans regard the USSR as a more reliable supplier than some OPEC countries. Given the absence of sufficient alternative gas supplies during the 1980s, they feel strongly that the pipeline will enhance their energy security rather than detract from it. They also believe that they could cope reasonably well with even a total cutoff of Soviet gas deliveries, through a combination of conservation, fuel-switching, temporary increases in domestic gas production, and drawdown of gas stocks.

Although projections of West European demand for gas have been cut sharply over the last few years, we estimate that consumption in 1990 will nonetheless be

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some 30 billion m³ higher than in 1980—equivalent to the maximum delivery capacity of the new export pipeline. Moreover, domestic production—mostly in the Netherlands—is expected to begin a steep decline within a few years. Should gas consumption fall well below expectations later in the decade, the West Europeans could respond by temporarily reducing domestic production. Any surplus probably would disappear within a few years, as Western Europe now appears to be facing a gas shortfall in the 1990s.

Employment. The West Europeans prize the jobs provided by pipeline-related export contracts. While the actual number of jobs involved is rather low—perhaps several tens of thousands total for the four countries involved—they tend to be concentrated in depressed industries and depressed regions. Moreover, unemployment is at or near post-1930s records in most of these countries, making any jobs-related issue a sensitive matter.

Prices. Soviet gas also looks attractive to the West Europeans because it is relatively cheap in comparison either with OPEC oil or with gas from other potential suppliers such as Norway or Algeria.

Detente. Finally, the West Europeans regard trade with the Soviet Union as a stabilizing element in East-West relations and consequently as a factor enhancing their national security. They have been unwilling to give up detente in Europe because of Soviet expansionism in other parts of the world, and they do not appear to give the United States much credit for shouldering the burden of protecting their interests in other areas, especially the Middle East.

Soviet Options

Moscow has a wide range of options available to meet its gas delivery commitments to Western Europe under the contracts recently negotiated or still under negotiation. The most important options relate to sources and types of equipment, use of other pipelines, and adjustment of gas delivery schedules.

Alternative Sources of Equipment

Moscow can try to convince Western suppliers to deliver the equipment now on order, equip the pipeline with Soviet turbine-compressors, or work out a combination of these approaches. Some of the technical options are listed in table 3. In most cases these options *individually* would provide adequate compressor power for a substantial flow of gas through the export pipeline in 1984. Equipping all compressor stations with the planned array of equipment (both on line and standby) would extend final completion of the export pipeline to around 1987-88.

The first option is the most attractive to the Soviet Union. For example, if the USSR obtains turbines built with the 20 or so rotor kits already shipped to AEG-Kanis, Nuovo Pignone, and John Brown, and Alstom-Atlantique supplies the 40 rotor kits ordered last November, Moscow could power about 30 of the planned 40 line compressor stations. Because pipeline throughput is not linearly related to compressor power (see figure 2), the export pipeline could deliver about 25 billion m³ per year, about 85 percent of designed capacity. Annual deliveries at this rate would exceed the total volume of gas that the West Europeans have contracted for or are likely to buy in the late 1980s.

Moscow's attempts to improve the availability, capacity, and reliability of the Soviet gas turbines manufactured for gas pipeline service have been meeting with some success, according to recent reports. Soviet-made gas turbines, which account for the bulk of compressor power installed on Soviet gas pipelines, have up to this time been produced mainly in 6-MW and 10-MW sizes—considerably smaller than the 25-MW unit desirable for the most efficient performance on 1,420-mm pipelines.

The Soviets may be close to a breakthrough in development of larger turbines, however. After a decade of development, prototypes of the Soviet GTN-16 (16-MW) and GTN-25 (25-MW) units have been built and tested. According to Soviet reports, serial production of these units is beginning. If even 10

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Table 3

Soviet Technical Options To Counter the US Embargo

Soviet Technical Options To Obtain Compressors for the Export Pipeline	Probability of Realization	Cost to Soviets	Initial Substantial Volume ^a	Full Throughput Capacity ^b	Probable Reliability of Pipeline Operation
Use of 20 GE-manufactured rotor sets already in Europe and the 40 Alsthom-Atlantique rotors (ordered in November 1981) in 25-MW Frame V turbines	Very High	Low	1984	85% in 1987 ^c	High
Accelerated introduction of the Soviet 16-MW and 25-MW turbines	Very High	High	1984	1988	Low
Use of smaller (e.g., 10-MW) Soviet-built turbines	High	Moderate	1984 ^d	1988	Moderate
Use of Soviet 25-MW turbines with Soviet-designed rotors manufactured in Western Europe	Moderate	Low	1985	1988-89	Moderate
Use of smaller, West European turbines ^e	Low	Moderate	1984	1987-88	High

^a Initial export delivery volumes of at least 7 billion m³/yr, excluding all other options listed.

^b Full capacity of pipeline (using gas from the pipeline as fuel for turbines and delivering about 30 billion m³/yr to Czech border), excluding all other options listed.

^c Additional turbines supplying a total of 1,500-MW would be required to reach 100 percent of planned throughput capacity and provide for installation of all standby units by 1988.

^d Output of GTK-10 turbines would suffice for export line and some—but not all—planned domestic pipelines.

^e A mix of Western variable speed turbines such as those made by Sulzer or Stal-Laval.

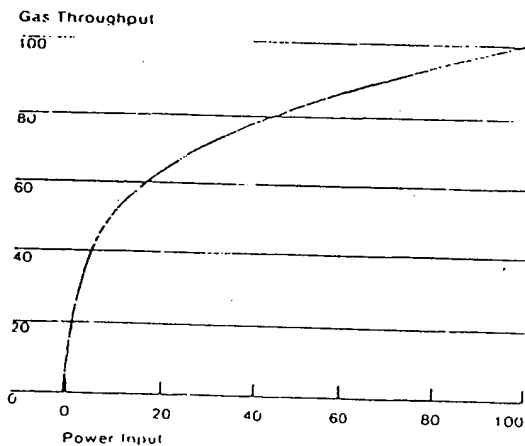
to 15 turbines in each of these series could be produced annually. Moscow's capacity to equip the export pipeline at minimum cost to the domestic economy would be considerably enhanced. But Soviet turbines have a service life between major overhauls that is only a small fraction of that offered by Western equipment. The Soviet units, moreover, have been chronically in short supply, causing long delays in bringing domestic pipelines up to full throughput. For the new larger turbines—as yet untried under Soviet pipeline operating conditions—the question of reliability and service life is undoubtedly worrisome to Soviet gas industry officials and reinforces their basic preference for Western equipment on the export pipeline.

Alternative Types of Equipment

While 25-MW gas turbines are the best power source, the Soviets could turn to smaller gas turbines, other power sources such as electric motors, or some combination of equipment. Although Moscow probably would not mix different types of compressor drive equipment in any one compressor station for reasons related to pipeline control and maintenance, it is considering an option to equip some stations with Western equipment and others with Soviet equipment. This is technically feasible and offers a way of accelerating completion of the pipeline. For example, Moscow might combine options such as the first and second options listed in table 3. The Soviet Gas Ministry has a strong preference for powering gasline compressors with gas turbines fueled from the pipeline, in part because this mode of operation achieves independence from reliance on outside energy sources.

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Figure 2
Relation Between Compressor Power and Gas Throughput on Large Pipelines (in Percent)



and does not reduce local energy supply in the regions transited. We believe that the use of electric motors would be avoided by the Soviets because of the need for new powerlines in Siberia, the drain it would impose on already heavily taxed power grids in the western USSR, and the possible difficulties associated with variable speed control on 12-MW or 16-MW motors.

Use of Other Pipelines

Moscow may elect to supply some of the gas called for under the new contracts with West European purchasers through excess capacity in the existing gas transmission system to Western Europe, and it could also utilize pipelines in the rapidly expanding domestic trunkline system carrying gas from the huge Urengoy field to the western USSR. By the end of 1982, the Soviets will have laid three new 1,420-mm pipelines from Urengoy into the western USSR, accounting for 7,000 km of the 14,000 km of domestic gas trunklines planned for 1981-85. Through inter-

connections with the existing gas transmission pipeline network, or by extending one of the new pipelines (for example, some 1,300 km from Novoposkov to Uzhgorod), sufficient gas could be diverted from the domestic system to meet the new export delivery commitments. This course of action, however, would result in a somewhat higher shortfall in domestic gas deliveries than would diversion of Soviet equipment to the export pipeline.

Adjustment of Gas Delivery Schedules

West European gas requirements through 1987 are likely to fall well below the full volume specified in the contracts. Moscow therefore may be able to adjust the phasing-in of gas deliveries to some or all of the West European customers. (The West Germans have already approached the Soviets about postponing full delivery from 1987 to 1988.) Such adjustments would in turn permit stretching out equipment delivery and installation schedule.

Implications for the Soviet Economy

Since the USSR apparently can meet its commitments for delivering gas to Western Europe despite the expanded US sanctions, we believe that there will be little or no effect on the Soviet hard currency position in the 1980s. The qualifications to this judgment are:

- Some of the options imply higher hard currency costs of obtaining Western equipment. West German and British turbine manufacturers, for example, professed reluctance to rely on Alsthom-Atlantique for rotors because they would be too expensive. But the added cost would be trivial in comparison with anticipated revenues from Soviet gas exports, and Moscow would probably pick up the tab for some increase in project costs.
- If project delays were to lead the USSR to ask for a stretched-out buildup of deliveries through the export pipeline, the loss of hard currency earnings could amount to roughly \$1.5 billion annually for a year or two.

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- Should the USSR push some gas intended for domestic use through existing pipelines before the new export pipeline is ready, it might have to use oil internally where it had hoped to use gas. The oil might have to be held back from export to hard currency countries, resulting in an earnings loss of almost \$200 million for the oil equivalent of each billion m³ of gas displaced

The principal impact of the sanctions on the Soviet Union would be added strain on an extremely taut domestic economy. The diversion of Soviet-made compressor equipment from the domestic gas transmission system would increase the real cost of the export pipeline project to the Soviet economy and would decrease the reliability of the export pipeline. In the extreme case—denial of all Western compressor equipment coupled with a crash Soviet effort on the export pipeline—the USSR could lose roughly 30 billion m³ of gas production in 1985 because of reduced compressor power on the domestic transmission lines. The forgone production would represent about 5 percent of planned output of gas in 1985 and somewhat less than 2 percent of planned energy production

Moscow clearly would prefer to avoid the disruption in domestic energy plans that would result from diversion of equipment to the export pipeline. Some of the increase in supply of Urengoy gas to the domestic economy is needed to offset declining gas availability from the older Ukraine and Caucasus gasfields. The planners cannot be sure that domestic production capacity can be geared up quickly enough to supply compressors for both the export pipeline and the equivalent of even four of the five domestic lines planned for 1981-85. If necessary, however, the Soviets would accept the costs entailed in order to ensure the expected hard currency revenues from the new gas sales beginning in 1984. Facing a tight supply of energy in the mid-1980s, Moscow might be forced to reduce delivery of fuels to Eastern Europe more

rapidly than it now deems politically feasible. It would also have to make internal adjustments in planned gas consumption that could:

- Curb efforts to substitute gas for oil and coal.
- Reduce industrial efficiency, especially in metals and petrochemicals.
- Intensify competition between sectors of the economy for scarce resources

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Rome will sit on the fence as long as possible but if forced to decide probably will follow the French and British example

France. Among the West European leaders, President Mitterrand has been the most outspoken in declaring that France will not engage in economic warfare against the Soviets; he believes that acquiescing in the new US sanctions would be a move in that direction. Paris is convinced that the US claims of extraterritoriality and retroactivity are weak. The French also insist that contracts already concluded must be carried out

⌊

French officials are determined to see the pipeline completed. ⌊ they would have pursued some other option, such as joint efforts with the Soviets to develop separate technology or revival of the alternate European projects that had been advanced earlier but rejected by the Soviets in favor of GE.

West Germany. Government officials have stated that Bonn cannot allow the US sanctions to force West German firms to break contracts. Just after the US announcement ⌊

West European Government Positions

The four West European governments reacted to the sanctions extension with varying degrees of surprise and anger. They question the extraterritorial and retroactive nature of the sanctions, which are viewed as infringing on West European sovereignty. Other common themes are that the sanctions are inappropriate and will not affect Soviet behavior, that contracts must be honored and that the pipeline will be built.

West German leaders were shocked and dismayed by the sanctions extension, which they regard as a completely unacceptable intrusion on West European sovereignty. They are adamant that the pipeline will

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be completed [

] Because of the traditional West German respect for the sanctity of contracts, they are particularly upset at the retroactive aspect of the sanctions, and of course they are concerned about the added problems that may be caused for the effort to rescue AEG.

Bonn officials are worried about the impact on US-West European relations and thus have downplayed the sanctions issue in public. For example, Economics Minister Lambsdorff recently characterized it as nothing more than a family dispute [

] *Italy.* After some hesitation, Rome finally joined its European partners in condemning the US action. We believe that partisan differences within the Spadolini coalition on the wisdom of buying more Soviet gas and subsidizing pipeline contracts account for the initial hesitation and the persistent fuzziness of Italian positions. After the Foreign Ministry publicly stated on 24 July that signed pipeline contracts would be honored. [

] Given domestic political constraints, Italian officials probably will try to maintain an ambiguous position as long as possible. If Rome is forced to take a clear-cut stand, we believe the government will follow in the French and British footsteps [

Short-Term Outlook

According to the West European turbine manufacturers, the Soviets have given the firms until early August to come up with a solution to overcome the US equipment embargo. The deadline was reportedly given to company representatives at meetings in Moscow on 6-7 July. Conversations are continuing, but none of the firms appears to have come to a decision on how to proceed. At the same time, the Soviets are pushing the companies to aid in the manufacture of the GTN-25. Publicly, the West European governments have expressed determination to proceed with the project, and decisions to go ahead may be made at any time.

The Soviets have continued their hardline approach involving threats of contract cancellation and imposition of severe penalties against the financially shaky firms. The Soviet media have also become increasingly vocal in recent weeks. Soviet officials are claiming that they can equip the export pipeline themselves by accelerating development and production of their own 25-MW turbine. Such an effort has been endorsed by the Communist Party and the Council of Ministers. A joint resolution was adopted on 12 July stating that gas will be supplied for domestic users in quantities determined by the Five-Year Plan and for export in accordance with signed contracts beginning in 1984. Overcoming the US embargo continues to be seen in Moscow as a matter of national pride, and workers are being saturated with patriotic slogans.

We do not believe the Soviets will abandon their West European equipment connections so quickly, however, given the current friction between the West Europeans and the United States, their strong preference for the reliability offered by Western equipment, and the costs to the Soviet economy of going it alone. The Soviets probably are confident that a joint Soviet-

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West European solution can still be worked out; their deadlines have been set in the past and extended or ignored

The Soviets may be planning for the remote contingency that the expanded US embargo will be successful, but they almost certainly do not believe that the GTN-25 is by itself a viable, short-term alternative. Despite the risk to domestic gas supply that would be entailed by shifting smaller turbines from domestic pipelines to equip the export line, the importance of substantially increased hard currency earnings could prompt Moscow to take such a step. The availability of some Frame V turbines built with the GE rotors (either those already in Europe or the "spares" ordered from Alsthom-Atlantique) and/or West European manufacturing help with the GTN-25 would ease the internal burden of any turbine switching.

The West Europeans are beginning to act [

German banks also have formally signed the \$1.1-billion credit agreement for the pipeline. In addition to continued attempts to get the United States to soften or withdraw its sanctions, the West Europeans appear increasingly ready to take the final step in direct defiance of the sanctions and/or to take other actions against the United States. Incoming EC Ambassador to the United States, Sir Roy Denman, has already compiled a list of possible retaliatory actions—including legal challenges, withdrawal of support for US initiatives to liberalize trade in banking and insurance and to ease the international flow of investment and dividends, and the imposition of duties on US agricultural exports to the Community. The French Government has drawn up its own list as well, largely involving nontariff restrictions on US exports to France.

Despite the current acrimony, a point of no return has not yet been reached. The British, West Germans, and Italians have not yet shipped anything to the Soviets, and deliveries of rotors by Alsthom-Atlantique are a year away. Chancellor Schmidt and others are still working to find a compromise. Moreover, there still seems to be lingering hope that West European outcries over the issue will force the US to lift the embargo.

Final disposition of the rotors will determine the winner and loser in this political tug of war. Anything short of acquisition of the 20 or so rotors already delivered by GE to the West European turbine manufacturers plus the 40 spare rotors to be manufactured by Alsthom-Atlantique under GE license would be viewed as a policy failure from the Soviet standpoint. The Soviets undoubtedly feel that if the West European contractors can be persuaded to deliver the rotors, additional petroleum equipment embodying US technology will pour forth from Free World producers outside the United States. Many US patents already have expired, or soon will, and the economic advantage to be gained from copying US equipment and taking over US markets will not be ignored in Western Europe and Japan. In fact, this form of competition is already encouraged—and in many cases subsidized—by governments through provision of investment capital and concessionary financing for export sales.

Foreign governments and firms will be reluctant to disturb historic trade relationships with the United States. But if corporate survival and national interests conflict sharply enough with US policy, the legality of the US sanctions will probably be challenged directly by legislative or administrative measures or by actions in unfriendly foreign courts. Should business and economic conditions become worse for the West European pipeline contractors, the flood gates holding back equipment affected by the US embargo would be opened much sooner.

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