

Soviet Fossil Fuel Production Up Despite Bottlenecks

What one Italian industrialist has called the complementarity of the Soviet and Western European economies is apparent in the USSR's programs and problems in energy development. In the immediate term, the most accessible route to expansion of trade between these two sectors is that of further deals of the "resources for technology" variety, such as the natural gas for wide diameter pipe projects which have sprung up between the USSR and individual EEC members in the last decade. These enable the depressed Western European steel industry to produce and in turn help widen bottlenecks in Soviet energy infrastructure.

Incremental expansion of these East-West energy technology deals is occurring through barter arrangements, such as the late 1976 agreement for the USSR to supply 10 billion cubic meters of natural gas to Italy over a four-year period in return for shipments of steel pipe. But as the meager yield of last month's 180-man delegation of Italian industry representatives to Moscow at tests, want of financing blocks a far greater volume of trade. With gold-backed transfer ruble accounting under international agreements, a breakthrough which Moscow had broached but is not pushing hard at this moment, technology transfers would become possible on a scale sufficient to revolutionize the Soviet economy, chiefly by the mechanization of agriculture for higher yields and release of most of the 30 percent of the Soviet work force tied up in that sector. In that context, Western European, Japanese, and U.S. participation in rapid exploitation and exhaustion of Soviet fossil fuels would follow during international efforts to shift the world eco-

nomy onto first nuclear fission power and subsequently controlled thermonuclear fusion.

In the meantime, Soviet fuel exports contribute an important margin to Western Europe and selected Third World nations.

Leading Soviet officials, including State Science and Technology Committee Chairman V. Kirillin, have put their commitment to fusion breakeven and then commercial fusion power on record, and the Soviet advances in this field are well known. In the tenth five-year plan of 1976-80, however, fusion figures only in the R and D category. The plan features rapid growth of nuclear fission electroenergy production and exploitation of the vast fossil fuel and hydroelectric resources of the Siberian frontier. Here we review 1976 results in the context of this five year plan (5YP). (See Chart 1.)

Oil and Gas

The growth of oil and natural gas production during the 10th 5YP is inseparable from Siberian development. The older fields of both, located in the European part of the country, have peaked or will begin to decline soon. The entire 149 million ton increase in annual oil production targeted for 1980 is to come from Siberian wells, primarily in the Western Siberian region known as Tyumen' which is just east of the Ural Mountains above 58° north latitude. The giant Samotlor field on the Ob River there, with reserves estimated at one and a half times those of the Alaska North Slope, produced 111 million tons in 1976 (61 per cent of Western Siberia's output) and has not peaked yet. Although no field discovered since Samotlor

Chart 1—USSR 10th Five-Year Plan Energy Goals and 1976 Fulfillment

	1975 (ACTUAL)	1976 (ACTUAL)	1976 PERCENTAGE GROWTH	1980 (PLAN)	1976-1980 PERCENTAGE GROWTH (PLAN)
OIL (MILLIONS OF TONS)	491	520	6	640	30
NATURAL GAS (BILLIONS OF CUBIC METERS)	289	321	11	435	50
COAL (MILLIONS OF TONS)	701	711	1.5	805	15
ELECTROENERGY (BILLIONS OF KILOWATT HOURS)	1,038	1,111	7	1,380	33

SOURCE: EKONOMICHESKAYA GAZETA

began production in 1969 has equalled it in reserves, seven smaller Tyumen' fields were started up last year.

Anticipating the pattern of the entire 10th 5YP, Western Siberia's oil production grew faster in 1976 than the national total, rising 22 percent while the total was up 6 percent. As the Volga-Ural fields, which in 1960 produced 60 percent of Soviet oil but are now contributing under half continue to decline, Siberia must rise. Oil Industry Minister Shashin has forecast that an average 100 million tons per year new oil-extracting capacity must be put on production during the 10th 5 Year Plan, two-thirds of which will compensate declines elsewhere. Western Siberia is to rise from 30 percent of total production in 1975, to nearly 50 percent in 1980. Last year it reached 185 million tons, 35 percent of total.

The shift to Siberia was visible in 1976 natural gas production, where the plan-exceeding 11 percent growth was chiefly from four Western Siberian fields and the Orenburg field at the lower end of the Urals ridge (see Chart 2). The Orenburg field, which is the starting point for a major pipeline under construction as a joint Council for Mutual Economic Assistance project to carry natural gas to Eastern Europe, increased production 59 percent. The West Siberian fields and Turkmen Republic in the south were up, while the older Ukrainian fields showed no increase. The drop-off in Uzbek natural gas production in 1976 was due to a severe earthquake in the summer with its epicenter in the middle of the gas fields there.

Natural gas is the most rapidly developing extractive industry in the Soviet Union: its use in the Soviet steel industry doubled between 1966 and 1975 and tripled in chemicals, and it now fuels 40, 60 and even 80 percent of plants in various branches of these industries. Because the sources of this priority fuel are increasingly to the East and North, the pipeline and related transport re-

quirements are great. This is where a bottleneck has tightened already in the 10th 5YP. Gas pipeline construction was 5,500 kilometers last year whereas the average 10th 5YP year's increase should be in the vicinity of 7,300 kilometers to approach the 1980 target level (see chart 3). The 1977 year plan calls for playing catch-up, and the 1977 oil pipeline target represents a similar recouplement after a construction drop, although in that case the 1976 figure has not been officially declared a shortfall. Gas compressor and storage facility quotas were also missed in 1976.

In the wake of the 1976 pipeline shortfalls, the first months of this year have seen a lively debate aired over whether it is preferable to push ahead with maximum pipeline construction to the gas fields near or above the Arctic Circle or if it is better to build more industry in the far north to consume the gas there. A special team sent to Tyumen' last month by the party paper *Pravda* wrote a stinging criticism of "opponents" of the second argument, and urged the Gosplan and the Ministry of Energy to back the construction of methanol and ammonia plants and thermal power stations in the center of the Tyumen Region. The construction requirements of such industry in the north would be phenomenal, even by the measures of Siberian development, in which whole cities are going up around the hydroelectric power stations, industries and railroad in the more temperate parts of Siberia to the southeast.

The level of national mobilization for getting the utmost out of Soviet oil and gas deposits was also highlighted this month in remarks by the President of the Academy of Sciences, Anatolii P. Aleksandrov. Addressing a meeting of the Academy presidium, Aleksandrov made special reference to research in pressurization techniques to make possible fullest production from wells on the decline. Half of Aleksandrov's presentation

Chart 2— Natural Gas Production Shifts East

(BILLIONS OF CUBIC METERS)

	1975		1976		GROWTH (%)
	OUTPUT	% TOTAL	OUTPUT	% TOTAL	
UKRAINIAN SSR	68.7	24	68.7	21	--
TURKMEN SSR	51.7	18	62.6	19	21
TYUMEN' (W. SIBERIA)	35.7	12	47.8	15	34
UZBEK SSR	37.1	13	36.0	11	- 3
ORENBURG REGION (URALS)	20.0	7	31.8	10	59
KOMI ASSR (NORTH, WEST SIDE OF URALS)	18.5	6.4	19.6	6.1	6

SOURCE: EKONOMICHESKAYA GAZETA

Chart 3 — USSR Oil and Gas Pipeline Construction

(THOUSANDS OF KILOMETERS)

	8TH 5 (YEARLY AVE.)	9TH 5YP (YEARLY AVE.)	1975	1976	1977 (PLAN)	10TH 5YP (YEARLY AVE.-PLAN)
OIL & OIL PRODUCTS MAIN LINES	2.0	4.5	4.8	2.7	4.0	
GAS MAIN LINES AND BRANCHES	5.0	6.5	7.3	5.5	6.5	7.3

Sources: SSSR v tisfrakh 1975
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was devoted to the tasks of scientists in energy development.

Coal Industry Meets Construction Problems

Although the share of coal in Soviet energy production will decline during the 10th 5YP to approximately one quarter of the total in 1980, the planned 22 million ton increase in production for 1977 is the greatest in the past decade. While the growth of coal exploitation is to be more moderate than that of the other fossil fuels — ranging between last year's low 1.5 percent and 3.8 percent annual rises during the 5YP — the 1976-80 coal quotas include coal for an increasing portion of electroenergy generation, where coal and coal-oil mixes will take over from oil and gas in many power plants. This means more oil available for export.

While the overall coal production plan was met in 1976

by the skin of the teeth, 28 percent of the mines were under. More productive mines balanced them out. More troublesome for the prospects of reaching planned growth levels in the next few years was the government's report that in the *majority* of coal mining areas the plan for capital construction for the coal industry was missed. The 1977 target has been set at new capacity to produce over 20 million tons of coal, which compares with the 1976 12.6 million tons new capacity, and 24.4 million tons in 1975, the last year of the 9th 5YP which averaged new capacity for 22.8 million tons each year.

The 1977 coal increase is assigned chiefly to Siberian regions such as the Kuznetsk basin (assigned 3.5 percent increase) and the new Kansk-Achinsk fields in Eastern Siberia (to rise 9.5 percent). Coal production in January 1977 was 61.8 million tons, or 8 percent of the year's goal.

— Rachel Berthoff

Reactors Without Naderites And Dams Without Snail-Darters

The most rapidly expanding sector of the Soviet energy industry is primary electrical power production, from nuclear and hydroelectric power stations. Together comprising two-fifths of new power capacity to be built in the 10th 5YP (see chart 4), nuclear fission and hydroelectric plants are to be producing 277 billion kilowatt-hours in 1980, an increase of 90 percent from the 1975 level. Their share in Soviet electricity generation will then be 20 percent, compared with 14 percent today (see graph 1).

Whatever shortfalls may occur in meeting these goals, they will not be due to controlled environmentalists'

demands such as those which have crippled United States fission power projects. For the USSR, these power sources are in the development plan to stay.

Fission for the European Section of the USSR

The oil-rich Soviet Union was slower than the U.S. to build nuclear reactors for electrical power during the 1960s, although it had one 600 mWe station operating in the Ural mountains already in 1958. Now there is a second plant in the Urals, three in the European part of the country (including the 2,000 mWe Leningrad giant), one in Armenia, and one on the Caspian Sea which runs