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THE IMPACT OF ENERGY ON EAST-WEST TRADE -
RETROSPECT AND PROSPECTS

Note by the Secretary

Members of the Committee will find attached a German contribution on the above-mentioned subject.

2. This paper is circulated in view of the reinforced meeting on Soviet and East-European energy, to be held on 16th-17th February (see AC/127-A/829(revised)).

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The Vienna Institute for
Comparative Economic Studies

Academy of Sciences
of the USSR

Soviet Committee for European
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WORKSHOP ON EAST - WEST EUROPEAN ECONOMIC INTERACTION

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- A RECONSIDERATION AFTER A DECADE**

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THE IMPACT OF ENERGY ON EAST-WEST-TRADE - RETROSPECT AND PROSPECTS

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THE IMPACT OF ENERGY ON EAST-WEST TRADE

Note by the German Delegation

1. Retrospect

1.1 Energy Export as a Growth Factor in Soviet Trade with the West

1. Because of the discrepancy in natural resources reserves, East-West energy trade is a one-way street from East to West. The Soviet Union is the dominant supplier. During the period under investigation, it was able to gain the leading position among the energy-producing countries - in 1974 it became the most important oil producer and in 1982 the most important natural gas producer¹ in the world. In 1982, 31 per cent of the world's natural gas and 23 per cent of the world's oil were produced in the Soviet Union. Against this background, it is not surprising that in 1981, 80 per cent of the total value of all energy exports from East to West were from the Soviet Union alone. Among the various energy sources, oil (crude oil and petroleum products) holds top position among Soviet exports as well. Coal exports, which comprise only 2 per cent (1982) of total value, will therefore be neglected in the following discussion (see Table 1).

2. A pronounced concentration is also observable in the regional distribution of Soviet sales of hydrocarbons (oil and natural gas). A good two thirds of the value of all exports to the West in 1982 fell to only four recipient countries:

West Germany	24.4 per cent
Italy	17.7 per cent
France	13.1 per cent
Finland	12.6 per cent
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Total to these countries	67.8 per cent

3. The development of Soviet hydrocarbon exports during the past decade was characterized by remarkable stability in some respects and significant changes in others.

4. Soviet oil exports to Western countries were relatively stable. During the period of investigation they correlated closely with production development. In 1982 these sales were at 11 per cent of production - relatively as significant as in 1973. In the other years this proportion varied merely between 9 and 11 per cent. Thus the thesis, repeatedly made since the early 1970s, that the Soviet Union or the Council for Mutual Economic Aid (CMEA) would become a net importer of oil at the start of the 1980s is reduced to absurdity².

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5. Only after the first drastic oil price rise did the Soviet Union react with a clear expansion of export quantity. Between 1973 and 1976 the oil supplied rose from 46 to 60 million tons. Since then there have been no significant changes, although in 1982 exports to the West rose from 54 to 66 million tons, a 22 per cent increase³. This remarkable quantity increase was made possible primarily by cutbacks in supplies to CMEA countries (by roughly 10 per cent), rather than through an increase in production (which amounted to only 4 million tons).

6. Aside from vacillations during the 1974-1976 period, the relation between exports of crude oil and petroleum products also remained relatively stable. Crude oil, with a share of 55 per cent, dominated the first as well as the last year of the period under consideration. Nor was there any trend toward over-proportional extension of exported goods with higher value added - presumably because of the scarcity of refineries. It is also possible that the Soviet Union does not wish to risk expanding capacity, since a fall in foreign demand for Soviet oil could result in under-utilization. This policy could support estimates which find a decrease in oil exports more likely for the future. Of these, crude oil would be the first affected, that is, the percentage of oil products would increase⁴.

7. During the period under consideration, the Soviet Union's natural gas exports have changed greatly. Though in 1973 only a total of 2 billion cubic metres were exported to the West, in 1982 it was 25 billion cubic metres. The decision at the end of the 1960s to expand the range of exports to include this raw material has proved very advantageous from today's standpoint. First, because of differing availability (Soviet natural gas reserves are presumably greater than its oil reserves) and cost considerations (exploration and production of gas is said to be 33 to 50 per cent cheaper than of oil), the necessary substitution of oil exports by exports of natural gas was initiated. Second, the Soviet Union achieved heavy "windfall-profits" from its gas exports too - for natural gas prices are related to that of oil. The average price of one cubic metre increased ten-fold, and export revenue rose from 22 million transfer rubles (TRbl) (1973) to 2.7 billion TRbl (1982).

8. Long-term natural gas supply contracts provide the Soviet Union an assured market, certainly. However, in 1982 for the first time the Soviets suffered from the negative consequences of the purchase clauses which allow Western buyers to reduce the quantity of gas purchased because of a decrease in demand. In that year export quantities decreased by 4 million cubic metres, which reduced revenue from gas exports by 0.2 billion TRbl (-7 per cent).

9. Evaluation of the Soviet export goods structure also changed distinctly during the period under consideration. Before the first drastic oil price rise in October 1973, it was still viewed as unfavourable. The high proportion of raw material exports led Western forecasters to predict little growth in the value of exports, because neither demand for nor the prices of the exported goods were expected to increase significantly. In addition, production costs were relatively high, and showed a rising trend (because of changes in the regional distribution of production and the poor quality of deposits). This situation changed suddenly after the formation of the OPEC cartel and its aggressive price policy. Energy products became the most profitable and highest revenue earning of Soviet export goods, and were the decisive factor in the growth of the value of exports to the West. The revenue from oil, natural gas and coal exports rose from 1.3 billion TRbl (1973) to 15.0 billion TRbl (1982). The exported quantities did not even have to double to achieve these revenue increases (see Table 2).

10. Besides producing high "windfall-profits", OPEC's price policy, which was immensely advantageous to the Soviet Union, entailed the following two consequences:

- (1) The Soviet export goods structure became one-sided. In 1982, 80 per cent of all income from trade with the West was derived from the export of energy (see Table 3). Thus, the USSR's hard currency earnings became heavily dependent on price and quantity developments on the world energy market. The advantageous energy exports concealed the weakness of the Soviet export structure. Development of a broad, competitive range of industrial export goods could be neglected without negative consequences for export earnings. But in times of energy market stagnation, this weakness will become important and have a dampening effect on the growth of Soviet exports to the West.
- (2) Among the CMEA countries, the Soviet Union was able to increase its share of trade with the West significantly. Whereas in 1973 its proportion of exports among the CMEA nations to the West amounted to a good third, in 1982, it was more than 50 per cent. While the East European countries decreased in importance as trade partners with OECD countries during the period under consideration, the Soviet Union gained ground (see Table 4). But since the expansion of the value of Soviet trade is almost entirely due to price increases and hardly at all from quantity increases, one must conclude that the real level of trade between the West and the Soviet Union has diminished, not increased.

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11. Yet it is remarkable that the importance of the Soviet Union as a supplier on the Western energy market has increased. Its portion of the oil imports of OECD countries rose from 3.6 per cent to 6.0 per cent between 1973 and 1982.

12. In 1982 the Soviet Union supplied the following share of natural gas consumed in the three Common Market countries (supply beginning in 1973):

Federal Republic of Germany	21 per cent
Italy	30 per cent
France	15 per cent

(Source: European Community (publisher):
eurostate Hydrocarbons. No. 3/1983).

13. For these increases in an otherwise shrinking energy market, the following factors are probably primarily responsible:

- the prices of Soviet energy exports are generally lower than average world market prices. Thus they serve the goal of low-cost energy acquisition;
- energy purchases from the Soviet Union were also considered as a means of increasing the security of supply by diversifying purchase sources. Besides the détente policy, the fact that the Soviets consistently adhered to supply contracts has strengthened this view considerably - as opposed to energy suppliers from other regions (OPEC oil embargo, USA and Canadian uranium embargoes).

1.2 Eastern Europe: Diminishing Oil-refining Business

14. If one examines the development of East European oil exports, it is surprising that there is remarkable expansion between 1973 and 1981; in value terms it exceeded even that of the Soviet Union (see Table 1). Although compared to the Soviet Union, the quantities supplied by other CMEA countries were distinctly less, at approximately 16 million tons they still equalled a quarter of Soviet exports to OECD region.

15. Oil exports are an important item in the balance of Western trade for some CMEA countries (see Table 5). Thus, Romania was able to derive about 25 per cent of its hard currency proceeds from the sale of oil in 1982. Likewise in Inner-German trade, these products account for a quarter of the GDR supplies to the Federal Republic. In a specific arrangement concerning oil supplies, deliveries of the

GDR (2.5 million tons per year) are linked with Federal Republic supplies of crude oil (1 million tons per year)⁵. The expansion of Inner-German trade in the past few years is largely due to increases in the price of mineral products that the GDR exports.

16. Leaving Inner-German trade aside, the quantity of East European oil sold has decreased by a total of 25 per cent in the past two years. Whether this is a long-term trend cannot yet be determined; the decline in exports is most likely a consequence of the worsened price correlation between crude oil and petroleum products. On the West European spot markets some product prices were lower than the crude oil reference prices⁶. In Romania's case, the average value of petroleum product exports in 1979 was still 75 per cent higher than the average price for its crude oil imports; in 1981 it was only 4 per cent higher. In view of this market situation, the smaller CMEA countries obviously felt compelled to limit such refining, or tripartite, business.

17. In contrast to the Soviet Union, East European countries have to import crude oil required for refined products from OPEC countries. The theory that the smaller CMEA countries would export cheaply-acquired Soviet crude oil in product form at high world market prices must be discarded. Third-country imports of crude oil were in fact higher than product exports within the OECD region⁷.

18. Thus, despite their considerable expansion, these oil exports cannot be characterized as a driving growth force in trade with the West for the smaller CMEA countries. It is rather the case that proceeds from one region had to be used to settle accounts for the cost of imports from another region.

19. The possibility that some profitable refining business was done cannot be excluded. Oil is, after all, one of the most attractive export goods of some third world countries. Politically desirable trade relations might also have become economically advantageous if they resulted in the importation of crude oil - even if the oil were used only to manufacture oil products for re-export.

1.3 Digression: Price Mechanism Changes Forced Cutbacks in East European Imports of Soviet Oil

20. The Soviet 10 per cent cut backs of oil supplies to CMEA countries, begun in 1982 and presumably to continue through the end of the five-year planning period, were as surprising at first as the related increase of exports to the West. The Soviet Union had contractually agreed with its partner countries to hold supplies constant at the 1980 level during

the five-year plan of 1981-85. We can only speculate about the motives for deviating from concluded agreements. The following thesis appears plausible:

"Financial difficulties within the smaller CMEA countries primarily prompted the Soviet Union to cut back supplies. By the time of the period 1976-1980, the East European countries were already unable to cover the increased cost of oil through additional product exports. Instead they had to utilize credits from the Soviet Union. One indicator of this is the cumulative trade balance deficit between them and the USSR, which amounted to 6.2 billion TRbl for Poland, the GDR, Czechoslovakia, Hungary and Bulgaria combined between 1975 and 1980 (Romania did not import significant quantities from the Soviet Union until 1979). Neither the stagnating supply situation of 1981 nor the 1982 decline caused a reduction in the Soviet supply surplus - rather, this increased heavily:"

Cumulative USSR Trade Balance Surplus vis-à-vis
East European CMEA countries (excluding Romania)

In Billions of TRbl

<u>1975-1980</u>	<u>1975-1981</u>	<u>1975-1982</u>
6.2	9.2	11.5

21. This development indicates the limited ability or willingness of the East European countries to adapt. They postponed required real funds transfer payments for their oil imports into the future. In contrast to Western industrialized countries, they did not need to economize on oil until 1980; on the contrary, supplies from the Soviet Union were increased annually until that time. In addition, the financial burden was eased as a result of the distinctly lower Soviet price calculations compared with the world market price. The East European savings (excluding Romania) resulting from the price discrepancy amounted to nearly 25 billion TRbl for the period between 1975 and 1982, which corresponds to the value of Soviet exports to these countries in the year 1982.

22. Nevertheless, the price increases for Soviet oil in the past three years have been higher than one could have foreseen based on the principle of a sliding five-year average. The mode of calculation apparently has been changed since 1980; since then prices are seen to have been calculated according to average world market prices for the previous three years, rather than five. In the past three years this has led to distinctly steeper price rises. An evident price rise is also expected for 1983:

Soviet Oil Prices in CMEA Trade (1)

In TRbl per ton

Year	Price according to the Model Calculation: Average over the past		Actual Price(2)
	5 Years	3 Years	
1980	67.20	71.60	72.80
1981	83.30	94.90	94.40
1982	105.20	131.30	131.70
1983	135.16	171.40	-

23. Thus the following thesis may be proposed:

"The change in the price mechanism forced the smaller CMEA countries to cut back their oil imports from the USSR. If the three-year average is maintained, clearing prices will be nearly 10 per cent higher than the world market price by 1983 (see Figure 1). Price declines are to be expected for 1985 and 1986. However, the clearing prices will presumably remain lower than the world market prices for the planning period 1986/1990."

24. These developments will have negative effect on East-West trade. In the middle run, the East European CMEA countries will not be able to increase further their oil imports from the USSR for lack of hard currency and further import cut backs cannot be excluded. This will retard their internal growth and thus for their foreign trade expansion. In the long run, too, the Soviet loans will have to be paid back. This involves exporting "hard" goods to the USSR most of which could be otherwise sold to the West for convertible currency. Thus, indirectly, the oil price increases will negatively influence the East European countries' Western trade opportunities.

2. Propsects: Energy Exports as a Growth Hindering Factor in East-West Trade?

25. A major goal of Soviet energy policy, beyond generally economizing on energy, is the substitution of other products for oil. For domestic consumption, natural gas, coal and atomic energy are available alternatives; in international trade, in the middle run, natural gas alone is available for this purpose. In the long run, however, refined coal products may also be available for foreign trade as well. If the East-West energy trade outlook is to be evaluated, external (from the Soviet point of view)

(1) Excluding Romania

(2) Estimated

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as well as internal determining factors for Soviet export potential must be analyzed. Among the external influencing factors are (1) energy price developments on the World market, (2) Western trade policy on energy imports from the Soviet Union, and (3) Western policy on energy technology exports to the Soviet Union. Among the most important internal influencing factors are (1) the fuel reserves, (2) the investment possibilities for their development, and (3) the development of domestic consumption.

2.1 Oil Price Development and its Implications for Soviet Trade with the West

26. The drastic increases in oil prices in 1973/74 were largely responsible for the subsequent recession in the Western industrialized countries. At the moment all is quiet on the price front; retreat skirmishes are even occurring. Further real price reductions may not be expected at least until 1985. The OPEC countries have obviously learned that exaggerated price demands causes crises in the world economy, and that they too suffer the negative consequences. Despite all the uncertainty of such predictions, at present we may expect the abrupt price swings of the 1970s to remain a unique event; they could be viewed as compensation for the real price reductions that occurred in the two previous decades⁸. Of course, in times of economic recovery, the OPEC countries will always have to decide whether to exploit these opportunities to redistribute international income in their favour. But the negative experiences allow us to hope that they will resist this temptation in the future. Thus for 1985-1990 a basically constant real oil price is rather to be expected. Depending on the projected inflation rate, it would rise to 33.60 dollars a barrel (3 per cent inflation rate) or 37 dollars a barrel (5 per cent inflation rate) by 1990.

27. For the Soviet Union this means that terms-of-trade profits from energy exports are not to be expected in the 1980s; one of the most important factors in the expansion of the value of Soviet trade with the West in the previous decade therefore will not be in effect. In 1983 the Soviet Union will already have to absorb income setbacks in its trade with the West, based on the oil price decline. With a West-export volume of 500 million barrels, a barrel price decline of one US dollar c.p. corresponds to an income loss of 0.5 billion US dollars. Thus, income setbacks in the range of 2.5 to 3 billion US dollars will occur⁹. When one includes price reductions for natural gas, the result might be the complete neutralization of the beneficial effect of the dollar revaluation on Soviet export earnings.

2.2 Western Energy Import Policy

28. At present there is no mutually accepted policy on Eastern trade within the Western alliance. In addition to divergent positions on credit and technology policy, the question of politically tolerable dependence on Soviet energy supplies is the subject of controversial discussion. It is true that differences of opinion between the USA on one hand and the Europeans on the other¹⁰ are presently not being openly debated. But when the Reagan administration lifted the embargo measures affecting the natural gas pipeline business of European companies on 13th November 1982, it in no way abandoned its objections to East-West cooperation in the energy sector. President Reagan linked the termination of the American embargo to the condition "that no new contracts for the purchase of Soviet natural gas will be signed or approved during the course of our study of alternative Western sources of energy."¹¹

29. The major objections to the natural gas pipeline deal may be summarized as follows:

- Western European countries, and particularly the Federal Republic of Germany, would become too heavily dependent upon the Soviet Union for their energy supply. This would not only create economic danger, but could result in a limitation of political autonomy and/or negotiating power as well;
- by increasing natural gas exports, the Soviet Union would derive additional hard currency income which could be used to import Western technology and thus broaden its armaments capacity.

30. This is not the place to analyze the arguments in detail¹². The following conclusions, however, may be summarized. On the whole and in the long run the projected increase in natural gas supplies from the Soviet Union will not lead to a greater Western dependence on the Soviet Union for its energy supplies. It is even improbable that these supplies will be able to compensate fully for the anticipated drop in Soviet oil exports. As a result, the Soviet Union will not earn additional hard currency. Thus, increased supplies of Soviet natural gas are not only tolerable, but are also desirable from the viewpoints of the diversification of the sources of supply, and of the absence of damaging environmental implications. The supply of natural gas from the Soviet Union must also be judged positively from the standpoint of relatively cheap energy supplies. The profit-oriented gas companies of the West would not have approved these imports if cheaper alternatives had been at hand. Furthermore, the price agreements with the Soviet Union contain an adjustment clause - it guarantees that the importer can purchase the imported natural gas at competitive and profitable prices, if energy prices should decline¹³.

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31. The outcome of the controversy is hardly foreseeable at present - even though there are signs of relaxation in the American position. It is primarily a matter of political decision; the weight of economically-based arguments is of secondary importance.

32. For most of the West European countries, however, the question of increasing Soviet natural gas supplies is not likely to come up. Belgium and the Netherlands have just rejected Soviet offers, and Italy will obviously continue to temporize on ratifying its purchase agreements. Until now, the Soviet Union has been able to sell only ca. 20 billion cubic metres instead of the proffered 40 billion cubic metres. But the West's reservation is economically, not politically, motivated.

33. According to present Western projections, the energy - and specifically natural gas - demand will increase less rapidly than had initially been planned¹⁴. For the Soviet Union, the consequence would be that its original plans to substitute natural gas for oil exports would prove unrealizable. If high income setbacks from energy exports are to be avoided, increased efforts will have to be made to slow down the expected decline in its oil exports.

2.3 Export of Western Energy Technology

34. Aside from transport equipment¹⁵ (pipelines, compressor stations, pipe-laying machinery), imports from the West are not of great significance in the opening up of Soviet oil and natural gas reserves. It is true that no exact calculation of dependence on imports is possible because the exchange rate of transfer rubles to domestic rubles is not public information. But if one assumes the rate to be in the range of 1:1-2 (plausibility considerations tend to support a rate of closer to 1:1)¹⁶, at least rough estimates can be made.

35. Comparison of investments and equipment imports for the oil and natural gas industry yields the following relationships:

	<u>1971-75</u>	<u>1976-80</u>
Investment (in billions of Rbl)	23.49	36.70
Western imports (in billions of TRbl)	0.16	0.69
"Import quotient"	0.7-1.4	1.9-3.8

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Thus, seen as whole, dependence on Western technology is slight. An Office of Technology Assessment study reaches the same conclusion. The study investigated the actual and potential contribution of Western technology to the development of the Soviet oil and gas industry. In summary the report concludes: "It is also true, however, that the impact of Western assistance has been lessened by at least two important factors. First, whether for lack of hard currency, a lack of perceived need, or a fear of dependence on the West, the USSR has never imported massive amounts of oil-field equipment. Second, imported equipment and technology is usually less productive in the USSR than it would be in Western nations"¹⁷.

36. Thus, since the Soviet Union has become the world's most significant oil and natural gas producer without extensive Western assistance, the question occurs as to what effect a selective withholding of machinery and equipment could have on the oil and natural gas industry. Certainly, losses in productivity and/or postponements in realizing production goals could occur. But in view of international efforts to increase energy supply, such a policy is counterproductive for energy policy reasons alone. On the other hand, intense participation of Western companies in building the pipelines resulted in an expansion of Soviet export potential - which, in the final analysis, also served the West's energy policy aims. Should a more liberal export policy in this matter be adopted - which in view of the latest developments in the USA would not be surprising¹⁸ - it might indeed have a positive effect on production development in the USSR. However, this should not be over-estimated, especially since it is uncertain how far the USSR will be willing to become dependent upon Western technology after its recent experience with the pipeline embargo.

2.4 Soviet Export Potential as a Function of Domestic Economic Factors

37. The extent of reserves of oil and natural gas is not at present a limiting factor in extending production. Explored natural gas reserves (34,000 billion cubic metres) suffice to maintain production at the present level for 70 years. The extent of oil reserves is a state secret. They are likely to be significantly less than those of natural gas. For their part, however, the Soviet Union repeatedly points out that only a small portion of Siberia has yet been geologically explored (e.g. 20 per cent of the Tjumen territory) and that further oil reserves are thought to lie under the natural gas fields in the North. Moreover, in the long run, a new

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hydrocarbon source may be available. Siberian scientists have proved the existence of so-called hydrogas. This consists of hydrocarbons that bond stably with water under high pressure at low temperatures.

38. The critical question is thus not whether the reserves suffice for further production increases, but whether enough investment can be made available to exploit them. Without going into questions of competition with other sectors of the Soviet economy - e.g. agriculture, armaments - the rise in specific investment expenditures for energy may be pointed out.

39. In the previous decade, fuel industry investment was continuously enlarged. In 1973, 18 per cent of industrial investment were allotted to this area, and in 1981 the figure was 25 per cent (see Table 6). The oil industry obviously has priority. The means allotted to it in 1981 were twice as high as those for the natural gas and coal industries together. In 1973 the ratio was one to one.

40. At the same time, while the oil industry expenditures are rising, production growth is clearly slowing down. This results in a steep rise in the marginal capital coefficient (see Table 7). Whereas in 1973 an investment of 11 kopeks was necessary to increase oil production by one ton, 40 kopeks were necessary in 1980. In 1981 this figure rose in fact to 1.43 rubles.

41. At present it appears that the investment push that started in 1977/78 was required solely to stabilize oil production. But since investment in raw materials industries only pays off in production after longer time periods, the outlook for fulfillment of the five-year planning goal can be judged good. More important, however, a slight rise in production for the subsequent time period is not to be excluded. Also supporting this assessment is the fact that the USSR, in order to reduce hard currency deficits, might counter its failure to sell all of the 40 billion cubic metres of natural gas it wished to export with intensified efforts in oil production.

42. An important factor in the rising investment expenditures for the fuel industry is the regional displacement of production to the Eastern parts of the country. In 1983, about half the fuels produced came from Siberia. The increase in oil production in these areas has a double function to fulfill: It must (1) balance the exploitation decline in older developed areas and (2) secure the growth of total production.

With regard to the latter, in the present five-year plan only 30 per cent of Siberian additional oil extraction (85 million tons) accounts for the total increase (27 million tons). With natural gas exploitation the situation is considerably more favourable. Here the projected Siberian production growth - of 200 billion cubic metres, exclusively from the Urengoi field - corresponds to the entire projected Soviet production increase.

43. The results so far allow us to expect that the planning goal of 630 billion cubic metres for natural gas exploitation in 1985 will be reached. Lower production is also possible because of lower than expected exports. After that, however, production growth in this sector will level off. Then Siberian production expansion will presumably also have to balance off exploitation declines in other regions. Thus, the marginal capital coefficient will also rise in this fuel area. Since the fuel industry already claims a high portion of industrial investment, it will hardly be possible to compensate for these cost increases by disproportionately high allotments of investment.

44. Considering the imminent production growth limits, the development of domestic consumption takes on increasing importance for export potential. Cost considerations alone suggest the need for a more consistent economizing policy. According to Soviet figures, expenditures for energy-saving measures are two to three times lower than those for production expansion¹⁹. The opportunities for oil saving and substitution in the USSR are considerable. Specific energy consumption is a good deal higher than in Western countries, as the following comparison shows. Overall economic output per capita in the Soviet Union is well below West Germany's, yet primary energy consumption per capita was about 5 per cent higher in 1981.

45. It is doubtful whether even a major part of the potential for savings can be realized. The results so far are not encouraging. Elasticity calculations show that specific energy consumption (in relation to national income and industrial production) actually declined more slowly after 1973 than before.

46. The main obstacles to energy savings in the USSR are in-sufficient material incentives, obsolete plant, shortage of capital and lack of innovation in the civilian sector. In view of the growing urgency of these problems, specific energy consumption may be expected to decline more sharply in the future. This particularly applies to oil consumption. Here consumption increases are to be retarded not only by general economy measures, but also through substitution of natural gas, coal, and atomic energy for heating oil.

47. Based on these assumptions, the estimates of primary energy consumption are presented in Table 8. Combining these estimates with the predicted production data results in the estimated export potential presented in Tables 9 and 10. Accordingly, by 1990:

- a significant decline in oil exports down 50 million tons from 1982) and;
- a rise in natural gas exports of 50 billion cubic metres may be expected.

48. In trade with OECD countries this would mean a decrease in oil exports of ca. 40 million tons and an increase in natural gas exports of 20 to 30 billion cubic metres. This corresponds on balance to an export decline of 15 to 25 million tons in oil units.

3. Summary

49. Prognoses regarding the development of Soviet trade with the West are critically dependent upon the estimate of future Soviet energy exports. In 1982 the sale of oil (64%), natural gas (14%), and coal accounted for 80 per cent of proceeds from export trade with OECD countries. In the 1970s, hydrocarbons were the decisive growth factors in Soviet trade with the West.

50. The USSR's oil exports are likely to become less significant in the future for the following reasons:

- production will increase more slowly than domestic consumption, preventing a rise in the volume of exports;
- world market prices for oil are unlikely to increase in the short run, preventing a rise in the value of exports. In 1983 the income shortfall in trade with the West caused by the oil price decline will amount to 2.5 to 3 billion US dollars.

51. The USSR so far has not succeeded to the degree desired in contractually guaranteeing the substitution of gas for oil. The cautious import policies of West European enterprises are primarily responsible for this. Their restraint is economically, not politically motivated. Since a significant rise in natural gas consumption cannot, at present, be expected, additional orders - aside from the Italian contract which has not yet been ratified - are unlikely. Increases in supplies of natural gas are further limited by the fact that Soviet supplies for domestic consumption in

some countries are already high (e.g. in the Federal Republic of Germany, nearly 40 per cent in 1990). Higher shares would not be considered consistent with the policy of diversifying the sources of supply, and are thus unlikely.

52. With a higher proportion of natural gas in the fuel exports of the USSR, the quality of dependence changes. It is more difficult for the buyer to substitute for supply shortfalls. The seller's flexibility is limited as well; since price declines are connected with weakening demand, it is not possible to compensate for lower proceeds through increased quantities.

53. Since, in trade with the West, (1) the decline in oil export will be greater than the rise in natural gas supplied and (2) real price increases cannot be expected, income from energy export will suffer a real drop. The consequence is a worsening of Soviet terms of trade. Thus a factor that was of major importance in the expansion of the Soviet trade with the West in the past decade will be inoperative. Energy sources could now become a growth-limiting factor in East-West trade.

54. The adverse results of the neglect of the competitive export product development will become increasingly noticeable. It is to be expected that the USSR's share of international trade with the OECD countries will diminish in the years ahead.

55. If the West wants to avoid reductions in the supply of energy in the world market and a decline in its exports to the USSR, it should not be hostile towards the idea of East-West cooperation in the exploration of Soviet energy sources. Starting points for cooperation are to be found primarily in energy-saving and in oil and coal exploitation and/or refinement. Stagnating oil prices, however, pose the tough question of profitability of coal refinement.

Notes

¹ See L'Echo de la Bourse of July 1, 1983.

² See Werner Gumpel: Sowjetunion: Erdöl und Nahostpolitik. In: Außenpolitik. No. 11/1971, p. 676. Istvan Dobozi: Die Energieträger in der Wirtschaft des RGW (ungar.). In: Valóság. Budapest. No. 1/1973, p. 18 ff. Central Intelligence Agency: Prospects for Soviet Oil Production. Washington D.C., July 1977.

Since one is not always granted luck in prophecy, it may be mentioned that the author has consistently doubted these thesis.

See Jochen Bethkenhagen: Bedeutung und Möglichkeiten des Ost-West-Handels mit Energierohstoffen. DIW Sonderhefte. No. 104/1975, p. 252 f. UdSSR vor Erdöldefizit? By Jochen Bethkenhagen. In: DIW Wochenbericht. No. 50/1977.

³ The demonstrated OECD rise of 33 percent for 1982 over the previous year (52 million tons) to 69 million tons contradicts the Soviet figures of TRbl. If one takes these figures as base, an estimated value of 54 million tons (1981) and 66 million tons (1982) is derived.

⁴ See also John B. Hanningan and Carl H. McMillan: The Soviet-West European Energy Relationship: Implications of the Shift from Oil to Gas. Unpublished Working Paper. Ottawa, May 1983, p. 27 ff.

⁵ See Horst Lambrecht: Der Innerdeutsche Handel - ein Gütertausch im Spannungsfeld von Politik und Wirtschaft. In: aus politik und zeitgeschichte. Beilage zur Wochenzeitung Das Parlament of October 9, 1982.

⁶ See Antony Scanlan: Die künftige Rolle von Öl und Erdgas in der UdSSR. In: Energiewirtschaftliche Tagesfragen. No. 7/1983, p. 468.

⁷ On import policy, see Jonathan P. Stern: CMEA Oil Acquisition Policy in the Middle East and the Gulf: The Search for Economic and Political Strategies. In: Joint Economic Committee, Congress of the United States (Ed.): Soviet Economy in the 1980's: Problems and Prospects. Part 1. Washington D.C. 1983, p. 414 ff.

⁸ See Dieter Schmitt und Heinz Jürgen Schürmann: Die Entspannung auf den Ölmärkten darf die Energiepolitiker nicht einlullen. In: Handelsblatt of May 3, 1983.

⁹ See Jochen Bethkenhagen: Die Auswirkungen der Ölpreissenkung auf die UdSSR und die übrigen RGW-Länder. In: Bundesinstitut für ostwissenschaftliche und internationale Studien (Hrsg.): Aktuelle Analysen of March 23, 1983.

¹⁰ On the various positions, see Hans-Dieter Jacobsen: Die Ost-West Wirtschaftsbeziehungen als deutsch-amerikanisches Problem. Ebenhausen. June 1983. Angela E. Stent: Soviet Energy and Western Europe. The Washington Papers/90. New York 1982.

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R. Bresnick/J.P.Hardt: Soviet Economic Policy Toward West Europe. In: John P. Hardt (Ed.): Energy in Soviet Policy. Joint Committee Print, Washington, June 1981, p. 84 ff.

¹¹ Transcript of Reagan Speech on Soviet Union. The New York Times. November 14, 1982.

¹² For extensive discussion of these arguments, see Erdgas aus der UdSSR. By Jochen Bethkenhagen. In: DIW Wochenbericht No. 14/1981. Jochen Bethkenhagen and Heinrich Machowski: Ost-West-Wirtschaftsbeziehungen: Weiterentwicklung oder Restriktion? In: aus politik und zeitgeschichte. Beilage zur Wochenzeitung Das Parlament of April 2, 1983. The question of dependence has also been studied by the Common Market commission. They concluded that a significant interruption in supply (of at least 25 percent during six consecutive months) can be met and would entail minimal effects on end consumption. See Kom. (82) 653 final.Brussels, October 15, 1982.

¹³ Opposing claims are published from time to time. See Pipeline Pains. The Wall Street Journal. March 15, 1983, Europe's Pipeline Folly. The Wall Street Journal. April 28, 1983. Politics and Trade. The Wall Street Journal. June 3, 1983.

¹⁴ A further consequence is that the portion of Soviet natural gas consumed in the importing countries will be higher than originally presumed for 1990. In the Federal Republic of Germany the share could be around 40 percent.

¹⁵ On this, see Ed. A. Hewett: Near-Term Prospects for the Soviet Natural Gas Industry, and the Implications for East-West Trade. In: Joint Economic Committee, Congress of the United States (Ed.): Soviet Economy in the 1980's: Problems and Prospects, see above, p. 408 ff.

¹⁶ See Jochen Bethkenhagen and Heinrich Machowski: Entwicklung und Struktur des deutsch-sowjetischen Handels - Seine Bedeutung für die Volkswirtschaften der Bundesrepublik Deutschland und der Sowjetunion. DIW Sonderheft. No. 132/1982, p. 41.

¹⁷ See Office of Technology Assessment (Ed.): Technology and Soviet Energy Availability. Washington D.C. 1981, p. 10.

¹⁸ According to a New York Times report, the American State Department and Department of Commerce have spoken out in favor of relaxing restraints on the export of oil and gas equipment to the USSR.

¹⁹ See S. Jatrov and A. Pjatkin: Die Effektivität der Nutzung von Brennstoff- und Energieressourcen (russ.). In: Planovoe chosjajstvo. No. 2/1979, p. 16.

Table 1

Energy Imports of the OECD Countries from the USSR and Eastern Europe
- in mill. US-Dollar -

	1973		1981		Share of the USSR	
	USSR	CMEA(6) ¹⁾	USSR	CMEA(6) ¹⁾	1973	1981
Oil ²⁾	1 422	307	13 902	3 572	82.2	79.6
Gas	27	-	4 000	-	100.0	100.0
Coal	211	688	400	1 200	23.5	25.0
Total	1 660	995	18 302	4 772	62.5	79.3

1)Including Inner-German trade.-2)Crude oil and petroleum products.-3)Estimate.
Sources: OECD: Trade by commodities; DIW estimates.

Table 2

Soviet Energy Exports to OECD-Countries

	Value in mill.TRbl		Quantity in mill.t ¹⁾		Index 1982 (1973=100)	
	1973	1982	1973	1982	Value	Volume
Oil ²⁾	1 176	12 085	46.4	66.3	1 028	143
Gas	22	2 739	2.0	25.1	12 450	1 255
Coal ³⁾	124	192	9.3	3.4	155	36
Total	1 322	15 016	75.9	127.3	1 136	168

1)Gas in bill.m³; total in mill. t of coal equivalent.-2)Crude oil and petroleum products.-3)Coal and coals.
Sources: USSR statistical foreign trade yearbooks; DIW estimates.

Table 3

**Share of Energy
in Total Soviet Exports
to OECD Countries**
- Shares in per cent -

	1973	1982
Oil 1)	31.7	63.6
Gas	0.6	14.4
Coal	2.0	1.0
Total	34.3	79.0
1) Crude oil and oil products.		
Sources: USSR statistical foreign trade yearbooks; DIW estimates.		

Table 4

**The Importance of the USSR
and Eastern Europe
in East-West trade**
- Shares in per cent -

	USSR		CMEA(6)	
	1973	1982	1973	1982
Share in total CMEA(7) exports to OECD countries	36.5	55.9	63.5	44.1
Share in total OECD imports	1.3	2.1	1.6	1.2
Sources: CMEA countries' statistical yearbooks; OECD: Trade by commodities; DIW estimates.				

Table 5

**East European exports¹⁾ of oil²⁾
to OECD countries**

Country	1973	1975	1980	1981	1982
	total exports to OECD countries = 100				
Bulgaria	0.7	2.1	32.3	31.0	.
Czechoslovakia	2.9	4.3	10.5	8.7	.
GDR	7.2	8.9	22.7	24.5	.
Poland	1.7	2.8	5.0	5.0	.
Rumania	11.3	22.6	39.1	43.2	.
Hungary	1.4	1.8	5.7	6.6	.
Eastern Europe total	4.2	7.4	17.2	19.8	.
	mill. tonnes				
Eastern Europe total	8.3	10.0	19.7	17.0	15.5
Rumania only	2.5	3.3	4.8	4.5	3.3
<p>1)Including Inner-German trade.-2)Crude oil and oil products.</p> <p>Sources: OECD; Statistics of foreign trade; Federal Statistical Office: Technical Series 4, Set 6; OECD: Oil Statistics.</p>					

Table 6

**Investment in the Fuel Industry
in the USSR**

Year	Total	of which:		
		Oil	Gas	Coal
in bill. Rbl.				
1970	5.02	2.49	1.03	1.50
1971	5.51	2.76	1.12	1.62
1972	5.95	3.00	1.23	1.71
1973	6.31	3.08	1.48	1.74
1974	6.96	3.49	1.74	1.73
1975	7.29	3.80	1.78	1.71
1976	7.65	4.07	1.84	1.75
1977	8.38	4.50	2.03	1.85
1978	9.52	5.27	2.21	2.04
1979	9.90	5.86	2.02	2.02
1980	11.00	6.80	2.10	2.10
1981	12.30	8.00	2.10	2.20
1971-1975	32.00	16.14	7.35	8.52
1976-1980	46.45	26.50	10.20	9.75
in per cent of total industry investment				
1970	17.97	8.91	3.69	5.37
1971	18.18	9.11	3.71	5.36
1972	18.35	9.27	3.79	5.29
1973	18.48	9.03	4.34	5.11
1974	18.99	9.53	4.74	4.72
1975	18.72	9.77	4.56	4.39
1976	18.83	10.01	4.52	4.30
1977	19.69	10.58	4.77	4.34
1978	21.03	11.65	4.89	4.50
1979	21.83	12.92	4.45	4.45
1980	23.11	14.29	4.41	4.41
1981	24.65	16.03	4.21	4.41
1971-1975	18.57	9.36	4.26	4.94
1976-1980	20.98	11.97	4.61	4.40
Sources: USSR statistical yearbooks; DIW estimates.				

Table 7

**Investment per Tonne of
Production Increase in the
Fuel Industry of the USSR**

Year	Total Rbl/t coal equiv.	of which:		
		Oil Rbl/t	Gas Rbl/ 1000cbm	Coal Rbl/t
1970	0.08	0.10	0.06	0.11
1971	0.09	0.11	0.08	0.12
1972	0.11	0.13	0.14	0.14
1973	0.10	0.11	0.10	0.16
1974	0.08	0.12	0.07	0.11
1975	0.08	0.12	0.06	0.12
1976	0.09	0.14	0.06	0.18
1977	0.11	0.17	0.08	0.21
1978	0.14	0.20	0.08	1.81
1979	0.17	0.42	0.06	-0.30
1980	0.20	0.39	0.07	-0.44
1981	0.37	1.43	0.07	-0.15
1971-1975	0.09	0.12	0.08	0.13
1976-1980	0.14	0.24	0.07	1.22

Sources: USSR statistical yearbooks; DIW estimates.

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Table 8

**The USSR's Primary Energy Consumption
1973 to 1990**

	1973	1975	1980	1985 ¹⁾	1990 ¹⁾
	in mill.t of coal equivalent				
Total	1 265	1 402	1 664	1 917	2 174
of which:					
Oil	465	526	638	675	751
Gas	287	335	453	651	740
Coal	409	432	437	430	450
Nuclear energy	4	8	29	52	115
Other primary electricity	45	46	66	70	90
Other	55	55	42	40	28
	in mill.t ²⁾				
Oil	325	368	446	472	525
Gas	241	282	381	547	622
Coal	596	625	634	623	649
Nuclear Energy ³⁾	2	3	12	21	47
	structure in per cent				
Total	100	100	100	100	100
of which:					
Oil	36.8	37.5	38.3	35.2	34.5
Gas	22.7	23.9	27.2	33.9	34.0
Coal	32.3	30.8	26.3	22.4	20.7
Nuclear energy	0.3	0.6	1.7	2.7	5.3
Other primary electricity	3.6	3.3	3.9	3.7	4.1
Other	4.4	3.9	2.5	2.1	1.3
<p>1) Estimate. Assumptions: annual average growth in produced national income of 3.5 per cent. Elasticity of primary energy consumption in relation to national income 1981 to 1985 of 0.8 per cent, 1986 to 1990 of 0.7 per cent.-2) Gas in bill.m³, nuclear energy in 1000 MW.-3) Annual average capacity.</p> <p>Sources: USSR statistical yearbooks; DIW estimates.</p>					

Table 9

**Supply and use of oil in the USSR
1973 to 1990
- in mill. t -**

	1973	1975	1980	1981	1982	1985	1990
Crude oil production	429	491	603	609	613	628	630
Crude oil imports	13	6	6	6	6	6	6
Crude oil exports	85	93	122	116	119	121	66
Refinery input	357	404	487	499	500	513	570
Product imports	2	1	-	-	-	-	-
Product exports	33	37	41	43	44	41	45
Domestic consumption	325	368	446	456	457	472	525
Net exports of oil ¹⁾	104	123	157	153	156	156	105
Gross exports of oil ¹⁾	118	130	163	159	162	162	111

1) Crude oil and oil products.
Sources: USSR statistical yearbooks; DIW estimates.

Table 10

**Supply and use of natural gas in the USSR
1973 to 1990
- in bill. cbm -**

	1973	1975	1980	1981	1982	1985	1990
Production	236	289	435	465	501	620	730
Imports	11	12	3	3	3	3	10
Exports	7	19	57	61	59	76	118
Domestic consumption	241	282	381	407	445	547	622
Net exports	-5	7	55	59	56	73	108

Sources: USSR statistical yearbooks; DIW estimates.

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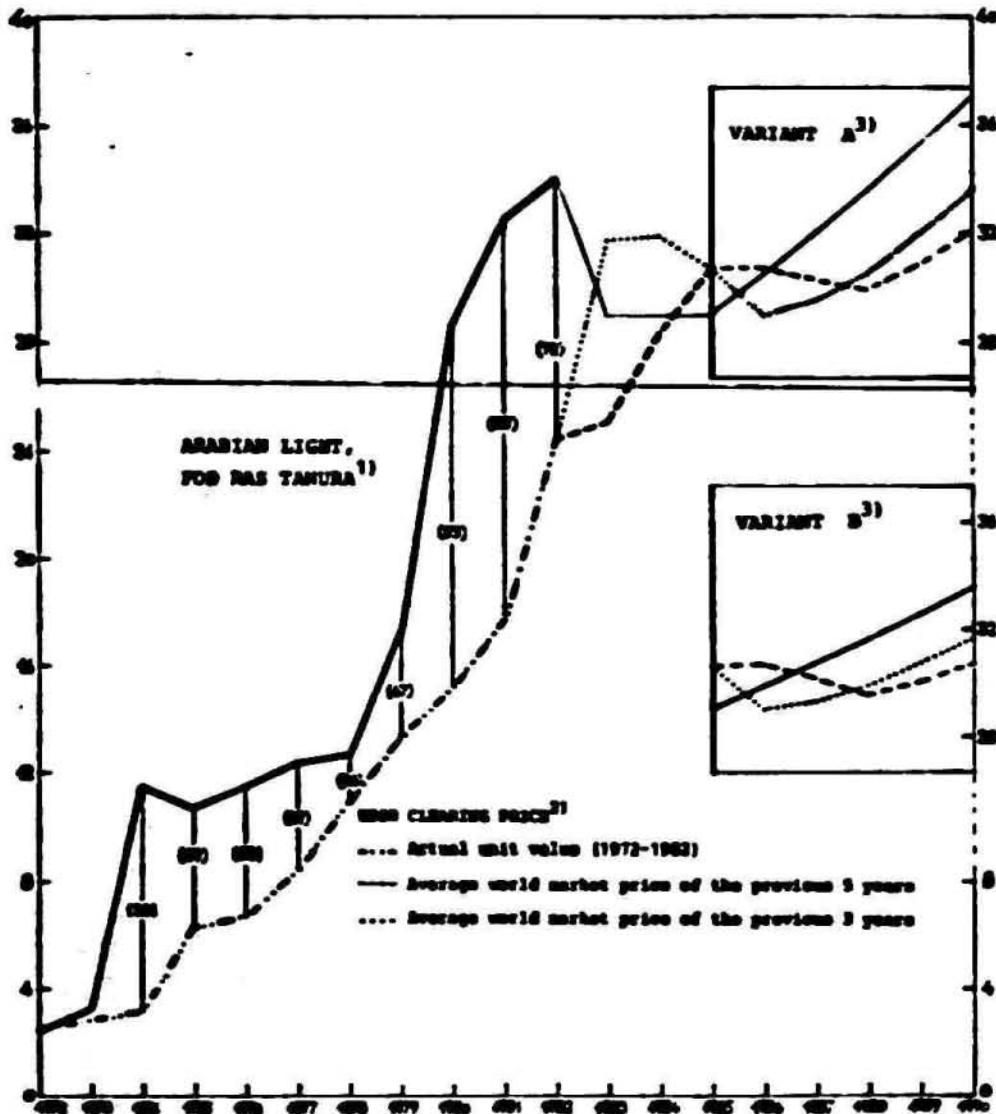
-8-

OIL PRICE ON WORLD MARKET
AND SOVIET CLEARING PRICE

1972 TO 1990

US-\$ per barrel

US-\$ per barrel



1) 1983 to 1990 estimate. - 2) 1972 to 1976: actual clearing prices (unit value for crude oil and oil products) calculated from USSR statistical foreign trade yearbook. 1977 to 1983: estimates of actual prices. 1983 to 1990 model calculations. - 3) Assumption: 1983 to 1985: constant world market price. 1986 to 1990 annual average price increase of 3 per cent. - 4) Assumption: 1983 to 1985: constant world market price. 1986 to 1990 annual average price increase of 3 per cent.

() = USSR clearing price in per cent of world market price.

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