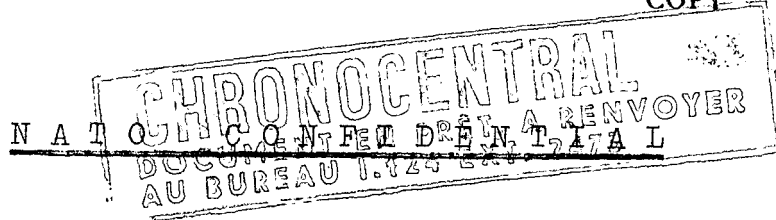


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ECONOMIC COMMITTEE

THE IRON-ORE MINING INDUSTRY AND IRON-ORE SUPPLIES
IN THE COMECON COUNTRIES AND YUGOSLAVIA

Note by the Secretary

The attached study, which has been prepared by the German Delegation, is distributed to members of the Committee for information.

(Signed) M. van den BULCKE

NATO,
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This document includes: 2 Annexes

N A T O C O N F I D E N T I A L

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Note by the German Delegation

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SUMMARY

In 1972 approximately 173 million metric tons of steel were produced in the COMECON countries, including Yugoslavia. Of this total, the USSR produced 126 million tons (73%), while 47 million tons (27%) came from the other COMECON countries and Yugoslavia. On the other hand, the COMECON countries and Yugoslavia contributed only 4% to the COMECON production of iron-ore, the USSR being responsible for 96%. This disproportion between the quantity of steel and of raw materials produced was due to the irregular distribution of the ore deposits on COMECON territory. The potential overall reserves are 120 milliard tons, 111 milliard tons (92%) of which are in the USSR and 9 milliards (8%) in the other COMECON countries, including Yugoslavia. The entire metallurgical industry in the Communist countries of Europe is therefore dependent on large imports of iron-ore from the USSR, which considerably restricts its development.

In the USSR, the iron-ore mining industry is concentrated in the West and Central regions. The ore is of poor quality and has to be prepared before being smelted. The raw material requirements of the COMECON partners will also be taken into account when assessing the future development of the mining industry.

As far as the other Communist countries of Europe are concerned, it is only possible to mention the mining industry of Bulgaria, 75% of whose iron-ore requirements are met from Bulgaria's own resources, and that of Yugoslavia, which is almost wholly self-sufficient in iron-ore. It is, however, of a very low grade, so that the cost of preparation is greater than that of imported ore.

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STUDY

The iron-ore mining industry and iron-ore supplies in the COMECON countries and Yugoslavia

I. General position

In 1972 the COMECON countries of Europe and Yugoslavia manufactured 173.3 million tons of steel, nearly 28% of world production. Their steel production was even greater than that of the OECD countries (1972: 163 million tons).

The iron-ore needed by the Communist countries of Europe comes from their own deposits. The potential reserves amount to 120 milliard tons, which is sufficient to cover the steel production of the various countries for more than a century. The distribution of these reserves within COMECON territory, however, raises problems with regard to the development of the metallurgical industries of the COMECON countries. While 92% of the iron-ore reserves (111 milliard tons) are in the USSR, the remaining 8% are divided between the other COMECON countries and Yugoslavia. This ore has a very low iron content and requires expensive processing. The iron-ore production of these countries is consequently very modest, their share of the total amount extracted in the COMECON, including Yugoslavia, being only 4%. However, the Communist countries of Europe (including Yugoslavia) are responsible for roughly 27% of the total COMECON steel production. As a result, the COMECON steel industries are heavily dependent on imports of iron-ore from the USSR which, in recent years, has supplied some 80 to 85% of the iron-ore requirements of those countries.

This dependence on imported raw material will increase still further until 1975, when over 90% of the iron-ore requirements of these countries will be met by the USSR.

II. The iron-ore mining industry and iron-ore supplies in the various COMECON countries

1. USSR

Approximately 45% of the iron-ore deposits of the USSR lie in the Western and Central regions of the RSFSR. These deposits are concentrated in the area of the "magnetic-anomaly" (iron-ore complex) of Kursk, in the Urals and in the Kola Peninsula. Vast reserves are found in the SSR of the Ukraine (31% of the total deposits) and in the SSR of Kazakhstan (approximately 14%). The region to the East of the Urals (Western and Eastern Siberia and the Far East) contain limited but valuable iron-ore reserves (10% of the total).

In recent years, extraction in the USSR has developed as follows (millions of tons):

	1965	1970	1971	1972
Commercial iron-ore (iron content 54%)	153.4	195.5	203	208
Iron equivalent	81	106.1	110.3	112.8

The main deposits are in the SSR of the Ukraine, which includes the greatest iron-ore mining centre in the USSR, Krivoy Rog. In past years, approximately 50% of the funds earmarked for the development of the iron-ore mining industry have been invested here. In 1972, 58% (120 million tons) of the iron-ore mined in the USSR came from Krivoy Rog.

Other mining areas are the Kursk complex, with 20 million tons (approximately 10%) in 1972, the Urals with 34.1 million tons (approximately 16%) and the SSR of Kazakhstan with 18.4 million tons (roughly 9% of Soviet iron-ore production). The Eastern areas of the USSR (especially the West Siberian mines) contributed 15 million tons (7%) to the total extracted.

The USSR produces more than enough iron-ore for its own metallurgical industry and exports the surplus, mainly to the COMECON countries. The following table shows the importance of these exports (millions of tons):

	1966	1967	1968	1969	1970	1971
Total Soviet exports of commercial iron-ore (iron content 54%)	26.1	28.7	32.2	33.1	36.1	36.5
Total exports to European Communist countries, viz. Poland	24.1	26.1	28.7	29.2	31.6	32.4
German Democratic Republic	7.9	8.6	10.0	10.0	9.9	10.3
Czechoslovakia	2.6	2.5	2.6	2.5	2.7	2.8
Bulgaria	7.7	8.7	9.5	9.2	10.8	11.0
Rumania	0.9	1.0	0.8	0.9	1.0	1.0
Hungary	2.4	2.7	3.1	3.8	4.2	4.3
	2.6	2.6	2.7	2.8	3.0	3.0

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	1966	1967	1968	1969	1970	1971
Exports of iron-ore to COMECON countries as a percentage of total iron-ore exports	92	91	89	88	88	88
Exports to COMECON countries as a percentage of the total amount of iron-ore extracted in the USSR	15	16	16	16	16	16

Soviet investment policy under the current five-year plan, which provides for the winning of 248 million tons of commercial ore in 1975, takes into account, as regards the development of the mining industry, not only the needs of its own expanding metallurgical industry but also those of its COMECON partners. It is for this reason that priority is given to extending the mines in the Kursk complex, in the Ukraine and Kazakhstan SSRs and in Western Siberia. No major improvements have been made in the obsolescent mines of the Urals. As regards the exploitation of the recently discovered iron-ore deposits in Eastern Siberia and the Far East, this is unlikely to take place before 1980, since any extension in these areas is slow, difficult and costly. The overall COMECON economic co-operation programme provides for participation by the European Communist countries in the extension of Russian mines by means of financial contributions and drafted labour.

Most of the Soviet ore has a low iron content: on the average, this was 37% in 1971. Furthermore, the ore contains several undesirable elements. Before being smelted in the blast furnace, therefore, it must be processed so as to increase the quantity and improve the quality of the pig iron.

The building of processing plants, however, has not kept pace with the increased winning capacity, so that bottlenecks occasionally occur in the supply of concentrated ore. In 1971, only 63% of the ore was enriched so as to obtain an average iron content of 62%.

It is intended to pay special attention in the future to the use of iron-ore aggregates in blast furnaces. The production of aggregates by the four special pelletization plants now operating in the USSR was 13.3 million tons in 1971. The USSR is endeavouring to purchase equipment from West German firms in order to achieve its 1975 target of 36.8 million tons.

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2. Poland

Poland, whose steel production was 13.5 million tons in 1972 (12.7 million tons in 1971) is the second Communist steel-producing country in Europe. The total Polish iron-ore deposits are very limited and the ore-mining industry is therefore small. There are still mine workings in the Czestochowa region, where 70% of the total Polish deposits are to be found. There are other mines at Leczyca and in the Kielce region, in the Swietokrzyski mountain. The ore is mainly lithoidal ferrous carbonate with an iron content of 25% to 35%.

As the following figures show, the extraction of Polish ore is tending to fall:

1965	1970	1971	1972
788	715	580	560

thousand iron equivalent tons

For economic reasons, it is intended to close the workings at Kielce this year, so in the years to come a sharper reduction can be expected in the amount of ore extracted.

Most of the iron-ore smelted in Polish blast furnaces was imported. The import figures for the last few years are as follows:

1968	1969	1970	1971
11.1	11.6	11.8	12.4

millions of tons of ore
(iron content: 54%)

Approximately 86% of this ore is imported from the USSR (see pages 5 and 6). The remainder comes from Sweden, Brazil, Norway and India. During the period of the 1971-1975 Plan, the USSR will supply to Poland, under contract, 30 million iron equivalent tons of ore.

To overcome this excessive dependence on the USSR, Poland wishes to buy more iron-ore than in the past from the Western countries, particularly Sweden. Under the terms of a trade agreement, Sweden will deliver to Poland, during the period 1976-1980, 17 million tons of high-grade ore from Kiruna.

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3. Czechoslovakia

With a steel production of 12.73 million tons in 1972 (12.06 million tons in 1971), Czechoslovakia is the third steel-producing COMECON country. It has the highest per capita steel production, 820 kg, of the COMECON countries, which is even higher than in the European Coal and Steel Community, where it is 542 kg per head.

National raw material supplies are quite inadequate for this relatively high steel output. The amount of iron-ore mined is insignificant, as the following figures show:

1965	1970	1971	1972
723	445	455	455

thousand iron equivalent tons

The only two main ore-mining centres in Czechoslovakia are:

- the Spissky-Gemer basin, in Slovakia, which mainly supplies the local steel plants at Kosice, in Eastern Slovakia;
- the Krusne Hory (Erzgebirge) region, in Bohemia, the most important mine being near Medence.

The extraction of iron-ore in the Central Bohemia, at Ejpovice, near Plzen, had to be abandoned in October 1967, owing to low production.

As regards the iron-ores used in Czechoslovakia, these are either chamosite or siderite. The iron content is low, 31%-35% in the Slovakian mining area and 36%-37% in the Bohemian mines, where deposits with a content of 45% may however be found.

At present, the quantity of ore won in Czechoslovakia covers only 6% of the requirements, so that 94% has to be imported.

During the years 1968 to 1971, iron-ore imports were as follows:

	1968		1969		1970		1971	
	million tons	%	million tons	%	million tons	%	million tons	%
Total iron-ore imports (iron content 54%)	11.1	100	10.7	100	12.7	100	12.6	100
From USSR	9.5	85	9.2	85	10.8	85	11.0	87
From Western countries (India, Brazil, Sweden, Morocco)	1.6	15	1.5	15	1.9	15	1.6	13

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During the period 1971-1975, the USSR will supply 31 million iron equivalent tons of ore under a trade agreement. This is an increase of approximately 20% compared with the period from 1966 to 1970. The Czechoslovak steel industry will therefore depend to a much greater extent on ore supplies from the USSR.

4. Rumania

The Rumanian steel industry is considered, together with that of Bulgaria, to be the COMECON metallurgical industry with the most rapid growth rate and the most up-to-date equipment. In 1972, steel production was 7.4 million tons (in 1971, 6.8 million tons). Rumanian steel production is scheduled to increase by 8.4% per annum by 1975. The supply of raw material for a steel industry with a high development potential is therefore a serious problem for Rumania.

Although national reserves of ore are limited, Rumania can meet 20 to 23% of its requirements from its own resources, thanks to intensive improvements in mining techniques. The quantities of ore extracted from 1965 to 1972 are as follows:

1965	1970	1971	1972	thousand iron equivalent tons
748	890	965	1,000	

The most important mining areas in Rumania are at Teliuc and Chelar in the Poiana-Rusca basin. The ore consists mainly of siderite and magnetite. The average iron content is around 28%. When it has been mined and enriched, the ore is smelted at the Hunedoara steel plant.

Other important mining districts are Ocna de Fier and Bosca, near the Resita metallurgical complex, to which ore is also delivered. The magnetite extracted has an average iron content of 30%.

Other economically workable deposits are at Capus (near the town of Cluj) and at Iueta in the Harghitei massif. These ores have an iron content of 30%-34%. Except for Harghitei deposits, they have not yet been mined, since they are very rich in phosphorus.

Rumania is obliged to import nearly 80% of the iron-ore required. The greater part (some 70% of total Rumanian ore imports) is supplied by the USSR (see pages 5 and 6). The remainder is imported from the Western countries. The USSR

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recently attempted to exploit the Rumanian metallurgical industry's dependence on raw materials in order to exert political pressure. Soviet iron-ore is delivered late and in insufficient quantities. Since several steel plants, such as the one at Galati, which produces about one-third of Rumanian steel, are entirely dependent on deliveries of Soviet ore, the Russian attitude is extremely prejudicial to the Rumanian steel industry. New supply agreements with Algeria, India and Brazil are of very little help since, owing to lack of currency and of suitable port facilities, Rumania cannot switch over quickly enough to importing ore from the Western countries.

5. German Democratic Republic (GDR)

Of all the COMECON countries, the German Democratic Republic is in the least favourable position to develop its steel industry. In 1971 and 1972, only 3% of the country's raw material requirements for the production of 5.58 million tons of steel in 1972 (5.35 million tons in 1971) could be met from domestic sources. The ratio between the amount extracted and that required was similar in recent years. From 1965 to 1972, iron-ore mining figures were as follows:

1965	1970	1971	1972
407	105	80	75

thousand iron equivalent tons

Iron-ore deposits in the German Democratic Republic are very limited and of low grade: 20% to 35%. Apart from the increasingly small amounts extracted in the Harz mountains and the Erzgebirge (haematite and limonite respectively), the limonite and siderite deposits in the Schmalkalden area and the chamosite and thuringite near Saalfeld, in the Forest of Thuringia, are among the most important deposits now being worked. The ores have an average iron content of 25% to 35% and contain a very high proportion of silicic acid, as well as 3% to 5% of manganese. The magnetite and haemitite mines at Schmiedefeld (Forest of Thuringia) were closed in 1972.

Unlike the other COMECON countries, the GDR imports a large quantity of black metallurgical raw materials in the form of pig-iron, from the USSR. In 1971 and 1972 1.7 million tons of Soviet pig-iron were imported (37% of the total black metallurgical raw materials). The remaining 60% was imported in the form of iron-ore, almost exclusively from the USSR, a small amount being supplied by Sweden, Brazil and Algeria.

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6. Hungary

Like the GDR, Hungary is one of the COMECON countries which produce a very small amount of iron-ore, the figures for recent years being as follows:

1965	1970	1971	1972
187	155	170	175

thousand iron equivalent tons

The most important mining area in Hungary is at Rudabanya, in the North-East, where siderite with an iron content of 30 to 37% has been mined since before the war. Remaining reserves have been estimated at 9 million tons. In 1971 new deposits of ore, with an iron content of 33%, were discovered in the neighbourhood of Alsotelekes, where it is proposed to open a new mine. Another small mine is located at Zengővarkony, near Pecs, in Southern Hungary; this supplies only the Dunaujvaros steel plant. In addition to these mines, there are in Hungary several less important deposits which have so far not been worth exploiting, owing to the low grade of the ore. In addition, several bauxite deposits, of which Hungary has a fair number, have an iron content of up to 23%. It is not known whether these ores can be used for the production of pig-iron.

Domestic mines cover only 9% of the needs of the Hungarian metallurgical industry, which produced 3.3 million tons of steel in 1972 (3.11 million in 1971). Hungary is obliged to import 91% of its ore, as well as insignificant amounts of pig-iron, from the USSR. The quantities imported from 1966 to 1971 were as follows:

	1966	1967	1968	1969	1970	1971
Iron-ore (thousand tons) (Iron content 54%)	2,696	2,808	2,830	2,914	3,119	3,156

Approximately 96% of the iron-ore imported comes from the USSR (see pages 5 and 6); small quantities of ore are supplied by Bulgaria. It is estimated that in 1973 Hungary will import 3.5 million tons of ore from the USSR. In 1971 and 1972, Turkey was a new ore supplier.

The Hungarian metallurgical industry's dependence on raw materials is felt particularly acutely because several steel works, such as the Lenin plants at Ozd and Diosgyor and the steel and metallurgical plants at Csepel, have been almost entirely converted for the processing of Soviet ore.

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7. Bulgaria

Apart from the USSR, Bulgaria is the only COMECON country which is mainly self-sufficient in ore (up to 75% of total requirements). Among other things, this ensures that the very high growth rates laid down in the recently established Bulgarian steel production plan will be met: in 1972, 2.2 million tons of steel were manufactured (1971: 1.9 million tons of crude steel). The quantities of iron-ore mined in recent years were as follows:

1965	1970	1971	1972
585	792	993	1,065

thousand iron equivalent tons

The most important iron-ore deposits in Bulgaria are near Kremikovtsi. They were discovered in the 1950s and have been estimated at 250 million tons. While this is a complex deposit owing to its geological situation, open-cast working is nevertheless possible.

The deposits are composed of haematite, limonite and siderite. The average iron content is 31%. The Kremikovtsi mine produces approximately three-quarters of Bulgarian iron-ore, mainly for the Kremikovtsi metallurgical complex. It is intended to increase capacity, especially that of the ore-processing plant, during the next few years.

Smaller ore deposits are located in the vicinity of Martinovo, near Mikhaylovgrad, in North West Bulgaria. These lodes consist of magnetite with a considerable element of magnetic pyrites; the iron content is around 34% to 40%. The ore is processed at the plant which forms part of the Christo Mikhaylov mine and is used to supply the metallurgical plants at Pernik-Dimitrovo and Kremikovtsi.

Since 1910, magnetite and haematite has been won from the oldest iron mine which is located near Krumovo, in the vicinity of Yambul, in South East Bulgaria. The average iron content is 44% and the workings are underground. The ore is processed on the spot and delivered to the metallurgical plant at Pernik.

Bulgaria is obliged to import 25% of its iron-ore requirements, 95% being supplied by the USSR (see pages 5 and 6). Small quantities are obtained from Algeria and India. Furthermore, during recent years an average of 295,000 tons per annum of pig-iron has been imported from the USSR.

III. The iron-ore mining industry and iron-ore supplies in Yugoslavia

In 1972, Yugoslavia produced 2.56 million tons of steel (in 1971: 2.45 million tons). Thanks to its extensive ore deposits, the country is almost self-sufficient as regards the necessary raw materials.

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The figures for iron-ore extraction in Yugoslavia since 1965 are as follows:

	1965	1969	1970	1971	1972
Crude iron-ore (thousand tons)	2,504	2,721	3,694	3,724	3,490
Iron equivalent tons (thousand tons)	914	1,051	1,425	1,440	1,350

The known deposits in Yugoslavia are put at 600 million tons of ore with an average iron content of 36%, the potential reserves being approximately 1.5 milliard tons.

The largest deposits are in Bosnia-Herzegovina (67% of the total Yugoslav iron-ore reserves). In this area, most of the Yugoslav iron-ore is extracted from the Ljubija mine near Prijedor. The deposits consist of vast lodes of siderite, considerably oxydized on the surface, with the result that it is mainly limonite, with an average iron content of 43%, which is extracted. The ore is used in the United Slovenia steel plant as well as in the blast furnaces at Sisak and, in part, at Zenice and Smederewo. It is intended to develop the iron-ore mines by 1975 by increasing capacity and by modernization.

The Vares mine, in central Bosnia, supplies both its own blast furnaces and those of the metallurgical plant at Zenica. The deposits consist of siderite which, like that at Ljubija, has been partly decomposed into limonite. Haematite is also mined. The iron content varies from 34% to 38%. In 1970, a new processing plant was inaugurated and other projects are planned for 1975.

The Bosnian iron-ore deposits were extended in 1969 as a result of the discovery of vast limonite lodes at Omarska. These were estimated, in 1973, at 113 million tons of ore with an average iron content of 50%. To exploit them, it is planned to build a new metallurgical plant near Prijedor which is scheduled to start producing 1.26 million tons of pig-iron in 1978.

Small deposits in Western Macedonia (the Tajmiste mine near Kicevo) and in Eastern Macedonia (Damjan) are mainly used to supply the metallurgical plant at Skopje. These deposits consist of siderite which has decomposed into limonite or of magnetite and haematite. The iron content is roughly 32% to 37% and 31% to 57% respectively.

The metallurgical plant at Smederewo, in Serbia, is supplied by the iron mine in the Kopaonic massif at Suvo Rudiste, where magnetite has been extracted since 1971.

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Yugoslavia also has several deposits which have been unexploitable so far (near Rzanovo in Macedonia, in the Kosovo-Metohija area, near Arandelovac and near Majdanpek in Serbia).

Many of these reserves contain a high proportion of nickel and chromium. Efforts were recently made to use them for the production of high-quality ferrous alloys. With Western help, a plant is being constructed in Kavadarci, in Macedonia, for extracting ferro-nickel, which will be processed at the Skopje metallurgical plant.

The position as regards Yugoslavia's external trade in iron-ore during recent years is as follows:

Iron-ore and concentrated products	1969	1970	1971
Imports (thousand tons)	264	212	195
Exports (thousand tons)	154	180	121

Whereas the imports come mainly from the Western countries (India, Brazil), the exports of ore are mainly to the COMECON countries.