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## Dependence on Foreign Raw Materials

by Franz-J. Jägerle, Hamburg \*

Being confronted with the oil crisis the dependency on foreign raw materials became worthwhile discussing again. Evaluations of certain raw materials indicate a low degree of self-sufficiency in some sectors. This article tries to give a general survey of the situation for the Federal Republic.

The Federal Republic of Germany ranks fourth among industrial nations and is thus one of the largest users of raw materials in the world. On its own territory however it has only a minute proportion of the wealth of raw materials known to exist in the world, which means that the Federal Republic must largely rely on imports to satisfy its needs. In 1970, for instance, the output of its own mining industry, DM 12.7 bn in value, compared with imports of mineral raw materials to a value of DM 18.6 bn, while its exports accounted for no more than 4.7 bn<sup>1</sup>.

To what a great extent the Federal Republic is dependent on imports to meet its requirements of individual mineral raw materials is shown in Table 1. The Federal Republic possesses adequate indigenous sources of supply only for coal and lignite. Of other mineral energy sources and metallic raw materials only a small percentage can be covered out of domestic production. A few brief notes — in the first place about the large group of raw materials for the energy sector — will give an outline of the relationship of supplies and requirements.

### Self-Sufficiency in the Coal Sector

In the energy sector world consumption is expanding at such a fast rate that supplies for the future are an especially important issue. About 24 p.c. of the primary energy consumption in the Federal Republic is currently met by coal. Maintenance of the present output level is guaranteed for a very long time ahead in view of the extent of the geological deposits, which are known to

exist or may be safely assumed to be available. So there is no need to anticipate any supply difficulty. Since the late fifties the coal mining industry has, however, experienced a continual process of adjustment to the structural changes in the energy sector. The advance of other sources of energy has led to a decline in

**Table 1**  
**Federal Republic of Germany 1972**  
**Dependence on Raw Materials**

Raw Material	Unit	Domestic Production	Consumption	Domestic Production in p.c. of Consumption
Hard coal <sup>a</sup>	mn t	102.5	88.6	116
Lignite <sup>a</sup>	mn t	110.4	101.3	109
Petroleum	mn t	7.1	134.0 <sup>b</sup>	5
Natural gas	bn m <sup>3</sup>	17.7	27.5	65
Copper <sup>c</sup>	1,000 t	1.3	524 <sup>d</sup>	0
Lead <sup>c</sup>	1,000 t	38.5	326 <sup>e</sup>	12
Zinc <sup>c</sup>	1,000 t	122	435 <sup>e</sup>	28
Tin <sup>c</sup>	1,000 t	—	16	0
Nickel	1,000 t	—	43	0
Iron ore	mn t	1.7	25	7
Manganese ore	1,000 t	—	572	0
Chrome ore	100 t	—	372 <sup>f</sup>	0
Tungsten ore	1,000 t	—	6 <sup>f</sup>	0
Molybdenum ore	1,000 t	—	14 <sup>f</sup>	0
Titanic ore	1,000 t	—	457 <sup>f</sup>	0
Bauxite	1,000 t	2	944 <sup>f g</sup>	0

<sup>a</sup> incl. coal and briquette; <sup>b</sup> incl. self-consumption of the refineries; <sup>c</sup> metal content; <sup>d</sup> without old and scrap metal; <sup>e</sup> incl. remelted metal; <sup>f</sup> import value; <sup>g</sup> aluminium.

Source: Statistics of Kohlewirtschaft e. V.: Der Kohlebergbau in der Energiewirtschaft der Bundesrepublik im Jahre 1972 (Stein- und Braunkohle, Erdöl und -gas) (Mining in the German Power Industry 1972 [hard coal, lignite, mineral oil and natural gas]); Metallgesellschaft AG: Metallstatistik (metal statistics) 1962–1972 (copper, lead, zinc, tin, nickel, bauxite); Statistical office of the EC: Eisen und Stahl, Zweimonatsstatistik, 1973, No. 3 (iron ore and manganese ore); Statistisches Bundesamt (Federal Statistical Office) Wiesbaden: Außenhandel, Reihe 2, Spezialhandel nach Waren und Ländern, December and Year 1972 (Chrome ore, tungsten ore, molybdenum ore, titanic ore).

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<sup>1</sup> Cf. F. Friedensburg, Die Versorgung der Bundesrepublik Deutschland mit mineralischen Rohstoffen und Energieträgern (The Supply of Mineral Raw Materials and Energy Sources for the Federal Republic of Germany). In: DIW, Vierteljahreshefte, 1972, No. 1/2, p. 38.

production from 143,000 tons in 1960 to 103,000 tons in 1972; in proportion to the total consumption of primary energy the use of bituminous coal has fallen by more than half. It remains to be seen whether this trend will continue or whether, in view of the signs of shortages developing in other energy carriers, it will be reversed. A reversion of the trend would presuppose significant technical improvements in production and a continuing high level of the prices of competing mineral oils, for economically bituminous coal has already reached the limits of its competitive efficiency<sup>2</sup>.

For lignite, the other energy material which is available in adequate quantities in the Federal Republic, the situation is relatively unproblematic. Lignite at present covers about 9 p.c. of the German primary energy consumption, and its proportional share has remained relatively constant over recent years. Large-scale opencast operations and immediate use of the bulk of production by lignite-burning power stations in the vicinity assure it of a solid position in the energy market. There will be no supply difficulties in the foreseeable future. The size of the geological deposits would indeed allow of a substantial increase in production.

### Mineral Oil and Natural Gas

Mineral oil is today by far the most important source of energy. While accounting for no more than 21 p.c. of the German primary energy consumption in 1960, it commanded only 12 years later a share of about 55 p.c. This development must cause concern since already now the Federal Republic relies on imports for as much as 95 p.c. of its mineral oil requirements. A further

relative decline in indigenous supplies must be anticipated, for consumption is rising fast while the domestic production is stagnating.

The large extent to which the Federal Republic of Germany depends on imports of mineral oil poses special problems because of the great geographical concentration of the sources of these imports. In 1972 five countries accounted for nearly 80 p.c. of all its oil imports (see Table 2), and no more than 18 p.c. originated in non-Arab countries. The drawbacks of such an one-sided concentration have been highlighted in the last few months. A diversification of the sources of supply therefore appears to be an urgent necessity.

A similar problem, though not of the same dimensions, faces the newcomer among the energy materials — natural gas. At present it covers 8.5 p.c. of the German primary energy consumption. The only impediment to increased use of this source of energy with its favourable environmental qualities are limitations of availability. As regards safety of supplies the structural trend, however, is unfavourable: in 1970 78 p.c. of requirements were still met by domestic production — in 1972 only 65 p.c. In the long run the Federal Republic cannot rest content with obtaining natural gas, as hitherto, exclusively from EC countries: additional sources will have to be opened up overseas<sup>3</sup>.

### Import Dependence in Metals

That the Federal Republic relies on imports almost entirely for most of its metallic raw materials is a well-known fact. Only very small quantities of iron ore, lead, zinc, copper and bauxite are mined locally. For tin, nickel and the group of other alloy metals for the steel industry the Federal Republic of Germany is without indigenous sources of supply. The same is true of other

<sup>2</sup> Cf. F. Friedensburg, *Ibid.*, p. 42.

<sup>3</sup> Cf. H. Stodiek, *Sicherung der Rohstoffversorgung* (Securing the Supply of Raw Materials), *ite-Mitteilungen*, No. 10/1972, p. 31.

**Table 2**  
**Petroleum and Selected Non-ferrous Metals — German Imports by Countries**  
(in p.c. of total imports)

Petroleum	Libya 28	Saudi Arabia 19	Algeria 11	Nigeria 11	Iran 10
Lead <sup>a</sup>	Ireland 28	Peru 18	Sweden 17	Canada 15	Bolivia 4
Copper <sup>b</sup>	Chile 23	Australia 16	Belg./Lux. 7	Zambia 6	Cyprus 4
Zinc <sup>c</sup>	Canada 47	Sweden 13	Peru 12	Mexico 4	Australia 2
Tin <sup>d</sup>	Malaysia 24	Indonesia 23	Thailand 16	Britain 12	China 1
Bauxite	Australia 60	Jugoslavia 15	Sierra Leone 9	Greece 3	Guyana 2

<sup>a</sup> lead ore; <sup>b</sup> ore, refined and unrefined copper; <sup>c</sup> zinc ore; <sup>d</sup> crude.

Source: Mineralölwirtschaftsverband e.V., Arbeitsgemeinschaft Erdöl-Gewinnung und -Verarbeitung (Working Group: Crude Oil Production and Processing), *Jahresbericht 1972 (Erdöl)* (crude oil); and Metallgesellschaft AG: *Metallstatistik* (metal statistics) 1962–1972 (lead, copper, zinc, tin, bauxite).

mineral raw materials such as asbestos, phosphates, platinum, diamonds, mercury, uranium, gold, etc.

Table 2 shows the origin by regions of German imports of individual metallic raw materials. It will be seen clearly that the bulk of supplies of these commodities is obtained from various countries, so that there is some spreading of the risk. In regard to individual raw materials, however, certain countries or groups of countries hold quite a dominant position — e.g. Chile for copper, Canada for zinc, Australia for bauxite, and the three ASEAN<sup>4</sup> countries Malaysia, Indonesia and Thailand for tin.

While these commodities will for a long time to come be available in sufficient quantities, supply difficulties could arise for the Federal Republic if the mentioned countries set about exploiting their strong position as suppliers in a similar way as the OPEC<sup>5</sup> is doing now. Such a danger cannot simply be ignored, especially not in the case of copper: four copper exporting countries — Chile, Peru, Zambia and Zaire — as early as 1968 joined forces in the CIPEC<sup>6</sup> which disposes of 25 p.c. of the world mining output and 27 p.c. of its smelter

production. In Malaysia, Indonesia and Thailand similar ideas are reportedly entertained for tin. Moreover, even industrialised raw material countries, like Canada and Australia, are growing increasingly aware of their raw material potential. When supply gaps threaten or actually occur as a result of economic or political crises, these countries have an effective set of instruments for the curtailment of exports at their disposal. They will certainly not hesitate to use them.

To sum up, the conclusion seems justified that the Federal Republic is assured of adequate supplies of raw materials in normal circumstances. In times of crisis, however, the great dependence of the Federal Republic on imports for almost all important raw materials, and particularly for mineral oil and non-ferrous metals, may become a cause for concern. In view of this situation it cannot be denied that there is some justification for the — lately increasing — demands that the efforts of the Federal Republic of Germany to safeguard its raw material supplies over the long term should be intensified.

<sup>4</sup> Association of South-east Asian Nations.

<sup>5</sup> Organisation of Petroleum Exporting Countries.

<sup>6</sup> International Council of Copper Exporting Countries.

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