Ferrous and Non-ferrous Metals —
A Problem of Supply or a Challenge?

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The following article represents an excerpt from a report made by the author on September 30, 1976 to the German-Brazilian Chamber of Commerce in Rio de Janeiro, sponsored by the Fried. Krupp Company. It offers an outlook on the future supply and demand situation for ferrous and non-ferrous metals and identifies a number of factors which might, in the long run, lead to supply problems for the Federal Republic of Germany. Against this background it illustrates the Federal Government’s policy for safeguarding the supply with metals vitally needed by the German economy.

The Federal Republic and the European Economic Community are more or less 100 p.c. dependent on outside resources for all alloy metals, copper, and to a lesser extent, lead and zinc. From a geological point of view there are almost no prospects of locating new significant deposits of all these metals within the European Community.

Recognizing this dependence on foreign resources, the Federal Government several years ago ordered comprehensive studies to be made in order to get a thorough knowledge of all raw material aspects, be they geological, economical or political problems. The background question was always fairly identical with my present subject: will there be a future supply problem with metals vitally needed by our economy, or can all problems be solved by simply buying from the markets? I will give the answer before the details: there are risks and we believe that there might be serious difficulties ahead. The entire policy of the Federal Government to safeguard a steady flow of supplies aims to minimize these risks and to put our industry in the long run in a competitive position in the raw material business.

Let us go into some important geological facts. From a study made by our Federal Institute for Geosciences and Natural Resources we learned that in the case of 45 minerals and metals, which cover more than 99 p.c. of world mining production, only seven countries account for more than 62 p.c. of total world output. This mining hierarchy, or the “Seven Giants”, as they could be named in rough analogy to the “Seven Sisters” in oil, reads as follows: The Soviet Union ranks first with roughly 24 p.c.; the United States holds the second position with 14 p.c.; Canada is fairly behind with 9.3 p.c.; Australia is with 4.6 p.c. Struggling for fifth and sixth place are the People’s Republic of China and Brazil, with 4.3 p.c. and 4.1 p.c. respectively. South Africa holds the seventh position with a mere 2.2 p.c. of world mineral production. None of these figures include hydrocarbons. Among the wide range of countries of the Third World, Brazil holds the first position.

Fear of Resources Depletion

The danger of “running out” of raw materials is the most naive of fears. Our geologists, supported by the US Bureau of Mines and the French BRGM, definitely say that a physical depletion of minerals and metals will not happen before the next century or even later. This is quite different from an attitude which came into vogue some years ago and which could be termed as the “doomsday syndrome”. This fear of depletion was introduced into public discussion by the MIT-study on the limits to growth. Surely, this study had one merit: The world began to think about resources depletion, and about conserving materials as a unique heritage of our planet.

True, the cost of extracting them may increase in the future, but this is another matter. Advances in the technology of prospecting and extraction, and improvements in productivity, may progress less rapidly than the exhaustion of the most easily accessible resources. At any rate, prospection must be carried out to the extent necessary to maintain reserves at a level sufficient to meet the next ten years of expected demand. If exploration investment were really made to such a degree — which we decidedly doubt, and that is a special point of my consideration — 10 years normally would be long enough to allow technical

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substitution for different materials, compensating adjustments in the pattern of demand. In any case it would be foolish to expect sudden calamities on the depletion score.

But the depletion discussion in my opinion had also other effects: some countries believe that they might obtain a redistribution of wealth by manipulating raw material prices, in the same way OPEC countries demonstrated so effectively for themselves.

If we come to the conclusion that raw materials are widespread over the earth's crust we have to investigate the question of where those resources can be found, who dominates them, and what the demand analysis shows for the years to come.

**Geopolitical Distribution**

As for the first question: Production capacity is a function of a country's reserve situation: the above-mentioned seven giants of world mining possess a share of world reserves similar to their share of world production. World reserves of the 18 most important minerals and metals are distributed as follows: industrialized countries 37 p.c., developing countries 32 p.c., and socialist countries 31 p.c. These are reserves which can be mined by commercial standards of today.

Our world is tripartite: each political sphere dominates more or less one third of the resources. New discoveries are certain — but let a geologist say, that the discovery ratio will never substantially change the division of resources among these groups. The situation of today is the result of thorough investigation in the most promising areas. New finds at best may shift the division by 1 p.c. or so which means in absolute figures a metal content of 1 bn tons, given the world's major metal reserves in the magnitude of 100 bn tons.

It is an interesting detail that some two dozen developing countries produce about 90 p.c. of the mining output of all developing countries. If we concentrate on the major ferrous and non-ferrous metals, the picture is even more favourable from the viewpoint of the industrialized countries: In the case of copper, 36.5 p.c. of primary production is mined in the United States, Canada, Australia and the Republic of South Africa. As to reserves, the industrialized countries hold 41 p.c. compared to 45 p.c. in the developing countries. Lead and zinc, twin metals in our smelting industry, are produced mainly in the USA, Canada, Australia and the Soviet Union. Again the bulk of the known reserves are to be found in a relationship 69 p.c.: 14 p.c. in favour of the industrialized countries.

If we consider the alloy materials which are essential for the production of stainless steel and advanced technological equipment, we can recognize a very marked geographic concentration. In the cases of chromite, manganese, molybdenum, nickel, cobalt, tungsten and the base metal iron, our detailed studies gave us a rather good feeling: the developing countries have a leading position in cobalt (55 p.c. share), the Eastern bloc in tungsten and vanadium (77 p.c. and 59 p.c. respectively) and iron. For all other alloy metals the Western mining countries have a major share.

**The Role of Private Mining Industry**

The second question is who dominates production of resources. In the developed countries, private mining companies, which are often vertically integrated "multinational" firms, do most of the operational chain: mining-smelting-semifinishing-marketing-recycling. The supply of the European and Japanese economies mainly depends on materials originally mined by these companies. It is remarkable that, despite growing governmental influence, the mining business is not carried out by state-owned companies. The reason for this phenomenon might be traced to historical evolution. All our big companies date from the late 19th or the early 20th century — a time, when there was no discussion of the role of private industry, planned economy and government participation.

Within the Third World we have to deal mainly with state-owned or controlled companies as our suppliers. Nationalisation has taken place in several cases: the former parent companies now serve as agents for marketing or suppliers of technology.

**Demand Outlook**

We have to deal with the third question — the demand for ferrous and non-ferrous metals during the years to come. In this case a distinction must be made between a short-term observation and a medium-longterm prognosis.

The actual supply situation is characterized by the consequences of the 1975 recession which hit the whole metal industry. To date the stocks of materials piled up during the recession still exert a decisive influence on commodity prices. The recession also brought a slowdown in many mining operations, so that the recovery taking place in the three main industrial centres — the USA, the European Community and Japan — could possibly meet with an insufficient capacity in some fields. But generally, from our German point of view, there is today no difficulty in buying ores and metals at whatever quantity and quality we want.