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Dependence on Imports in the Energy Sector

by Albrecht Iwersen, Hamburg *

The Federal Republic of Germany had only just recovered from the shock of the oil crisis when the stoppage of US uranium deliveries came as a forceful reminder of the dependence of its energy sector upon supplies from abroad. Fears have been voiced that the nuclear power stations may one day be faced with supply difficulties.

The Federal Republic is by no means favourably placed as far as natural resources in the energy sector are concerned. For crude oil in particular, which is now the principal source of energy, the country for lack of indigenous reserves is dependent upon imports from abroad; the German offshore area of the North Sea has failed to fulfil the expectations of some observers. The inadequacy of the energy position of the Federal Republic was highlighted by the oil crisis in the autumn of 1973. Since then increased efforts have been made to lessen the dependence upon the OPEC countries on the one hand and the big oil groups on the other, and various modifications have been made to the energy programme.

The current debate on ways and means of overcoming or lessening the dependence on outside sources of energy is based on the "Extrapolated Energy Programme" which the Federal Government presented towards the end of 1974.¹ The essential features of this programme are:

- ☐ To slow down the growth of crude oil consumption so as to bring down the share of oil in the total use of primary energy from 55 p.c. in 1973 (51.5 p.c. in 1974) to 44 p.c. in 1985.
- ☐ To strengthen the German position in regard to mineral oils and petroleum chemicals, mainly by merging the two state-controlled energy groups VEBA and Gelsenberg in the VEBA AG, and also by supporting the efforts for cooperation between consuming countries and more especially the member states of the EC.
- ☐ To step up the exploitation and utilization of indigenous resources: this means stabilizing the output of coal at a suitably high level and employing nuclear energy, natural gas, etc., which seem to be relatively immune from international conflicts, as substitutes for crude petroleum.
- ☐ To encourage the economical use of energy so as to reduce wastage (e.g. by better insulation of

buildings, improvements in the use of fuels, and heat storage).

- ☐ To carry larger stocks of oil and coal in particular as a protection against future emergencies.
- ☐ To intensify the research into new sources of energy and also for improvements and innovations in the application of traditional sources of energy.

The figures of the Extrapolated Energy Programme, in million tons of coal equivalent (C.E.) (see Table), clearly reflect the desire to avoid placing too much reliance on crude oil in the future. The coal output is not to be allowed to fall further but to be kept stable at a level of 79 mn t C.E., which is slightly less than the production in 1973. A relatively large increase is envisaged for the production of natural gas while the Federal Government does not forecast significant changes for lignite, hydro-electric power and similar sources of energy. Very substantial growth rates indeed are proposed for nuclear energy: its use is to increase more than eighteenfold — from 4.1 mn t C.E. to 81 mn t C.E. By 1985 the contribution of nuclear energy to the total supply of primary energy is to rise from a little over one per cent to as much as 15 p.c.

The Federal Government considers these changes necessary because the German energy position is characterized by the following facts:²

- ☐ The sources of energy are widely diversified but 57 p.c. of total consumption depend upon imports.
- ☐ The Federal Republic can draw on substantial indigenous coal deposits.
- ☐ The Federal Republic has the largest lignite deposits of all western industrialized countries.
- ☐ The local oil deposits in the Federal Republic cover only five p.c. of the total oil supply.
- ☐ About half the supply of natural gas currently originates from native sources, and an increase

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¹ Federal Ministry of Economic Affairs (ed.), *Erste Fortschreibung des Energieprogramms der Bundesregierung* (First extrapolation of the energy programme of the Federal Government), Bonn, November 1974.

² Federal Ministry of Economic Affairs (ed.), *Erste Fortschreibung des Energieprogramms der Bundesregierung*, *ibid.*, p. 15.

of this rate depends upon international commitments.

☐ The great efforts which have been made to advance the development of nuclear energy have taken the Federal Republic technologically into the leading group.

Bearing these various points in mind, it is not surprising that the Federal Government is giving first priority to nuclear energy rather than to crude oil with its well-known hazards.

Before the need for increased reliance on nuclear power stations for the generation of electricity and for acceptance of the risks involved in such a development is examined, it must be asked what alternative sources of energy if any are available to the Federal Republic. In theory there are:

- ☐ Solar energy,
- ☐ Waste heat of nuclear power stations,
- ☐ Wind energy,
- ☐ Tidal power and pumped storage stations,
- ☐ Geothermal energy,
- ☐ Energy from refuse incineration and sewer gas, and
- ☐ Hydrogen as an energy carrier.

All these forms of energy are at present still under investigation in regard to their suitability. It is fairly certain however that geothermal energy sources will not be used in the Federal Republic to any significant extent. The "heat budget" of the earth would in any case set a limit to the availability of geothermal energy, and environmental considerations also speak against its use.³ Only solar energy, wind energy, hydrogen and waste heat in their various forms of application seem to offer less unfavourable prospects for efficient use.⁴

It is in the nature of this research work that it can influence the energy situation only in the long term. In the meantime efforts must be made to find solutions for the shorter term. In an effort to raise the supply of natural gas to the projected level of 18 p.c. of total energy demand and to lessen the dependence on imported oil correspondingly it has been decided to place further contracts for natural gas for the German market: about 3.5 bn m³ are to be obtained from the Norwegian sector of the North Sea and some 5.5 bn m³ through the tripartite natural gas deal with Iran and the Soviet Union. The deep drilling programme in the Federal Republic is being intensi-

fied. According to the Federal Minister for Economic Affairs, Friderichs, it may be expected in the light of present knowledge that by 1985 about one quarter of the consumption of natural gas will be covered by the indigenous production, a little over 30 p.c. by supplies from the Netherlands and about 10 p.c. by Norway.⁵

For coal, which is the most important domestic source of energy, the situation has improved fundamentally as a result of the policy of the OPEC countries. The Federal Government asked the coal mining industry a short while ago to arrange for an output capacity of about 95 mn t in 1980.⁶ The Third Coal Electrification Law („Verstromungsgesetz“) which has come into force ensures that more coal will be used in the electricity industry. Suitable public assistance will facilitate the necessary investments. For the Ruhr and Saar collieries this means that their continued existence is assured for a considerable time to come.

There is probably no other source of energy in the Federal Republic which is as hotly disputed as nuclear energy. In the past it was always regarded as the safest form of energy and accordingly given a preferential rating. But the term "safety", it would now seem, was interpreted too narrowly: it was commonly applied to the power installations; the safety of the supplies of input materials was rarely considered. The present situation and recent constraints in the uranium market — especially in regard to the USA as a supplier for German power stations — have created major uncertainties. The export embargo which the USA imposed in April of this year and revised soon afterwards has given an impetus to a careful reconsideration of the role of uranium as a primary energy material.

As far as dependence upon imports is concerned, the position with regard to uranium is certainly relatively favourable insofar as there still are adequate sources in the world and these are distributed over a fairly large number of countries with which the Federal Republic is linked by good political and close economic relations, such as Australia, Brazil and Canada.

Moreover, the Federal Government has made provisions in this connection, as Research and Technology Minister Matthöfer pointed out recently.⁷ He stated that the Federal Republic has already purchased and stored some 230 t of enriched uranium under the Currency Offset

³ Ladislaus Rybach, Geothermik (Geothermics), in: *Forschung und Technik* (Neue Zürcher Zeitung), April 2, 1975, p. 47f.

⁴ Proceedings of the United Nations Conference on New Sources of Energy (Solar Energy, Wind Power and Geothermal Energy) in Rome, August 21–31, 1961, New York 1963.

⁵ Report on the 167th session of the German Bundestag, April 24, 1975, in: *Bundesanzeiger* No. 79, April 26, 1975.

⁶ Ibid.

⁷ Die Förderung von Uranprospektion und Uranexploration 1973–74 (The promotion of uranium prospecting and exploration 1973–74), in: *BMFT-Mitteilungen* (ed. Federal Ministry for Research and Technology), No. 5/1975.

Agreement of 1969/71 and acquired rights to uranium separation work, redeemable in 1979, which had a value of DM 220 mn. In the latest — 1973/75 — Currency Offset Agreement with the USA DM 220 mn had been set aside for the purchase of additional stocks. Positive results could also be expected to flow from the policy of opening diversified sources of supply for uranium and working energetically for the establishment of a native uranium enriching industry. In its budget for 1973/74 the Federal Ministry for Research and Technology had earmarked DM 65 mn for promotion of prospecting and exploration projects and participation of German firms in foreign enterprises. About DM 35 mn would be available for this purpose in 1975.

About DM 540 mn have already been committed to investments for the extension of the German-Dutch enrichment plant which is expected to cover about 30 p.c. of the German requirements by 1982 already.

Despite this and similar optimistic statements — and also the arrangements made with Brazil for instance for power station deliveries and exploration work in return for supplies of uranium — it would in my view be wrong to ignore the profound changes which have taken place in the uranium market. They were already apparent at the time of the German-Soviet negotiations on deliveries of enriched uranium.⁸ In 1973 U₃O₈ could still be obtained in the market for about \$ 6 a lb. Since then the buyers' market for uranium has been transformed into a sellers' market, and the price has doubled and trebled. As the situation in the uranium market tightened, it was no longer possible for all energy undertakings to place contracts for all the uranium which they wished to buy.

⁸ Offerte aus Moskau (Offer from Moscow), in: Der Spiegel, No. 15/1973, p. 49f.

Experts attribute the abrupt change in the uranium market to three developments in particular:

□ Negotiations and arrangements between the uranium producers have enabled them to deal with the supply surplus resulting from the prospecting boom and consequent pressure on prices in the last ten years.⁹

□ The producing countries are increasingly "energy-conscious". As a matter of policy they are carrying out more of the processing of their natural resources themselves, for instance by operating their own enrichment plants. Many of them refuse to commit themselves to long-term deliveries extending into the eighties, with the result that a demand backlog has built up.

□ The producing countries are more intent on safeguarding their own energy supplies than on securing export earnings.

The present situation in the uranium market would not have arisen if more prospecting work had been done in anticipation of the expected future requirements. The low prices however militated against the search for new deposits because the prospective profit margins were too low. Now, when prices are high, greater prospecting efforts appear once more to be worthwhile. And as the prospecting work is being intensified, larger supplies of uranium will become available. As there will be a continuous demand for uranium, however, the uranium price must not be allowed to fall below the level needed to ensure a commensurate prospecting and exploration effort. For the responsible authorities in the Federal Republic this means that they must base their long-term considerations on the expectation of a long-term rise in the price of uranium.

⁹ For instance, the producers' representatives at the symposium of the German Atomic Forum. Cf. W. D. Müller, Wo ist das Uran geblieben? (Where did the uranium get?), in: Atomwirtschaft und Atomtechnik, XX. (1975) No. 2.

Primary Energy Consumption and Future Needs

Energy Source	Consumption		Shares		Changes 1974		1980 b		1985 b	
	1973	1974 a	1973	1974	to 1973					
	mn t C.E.	mn t. C.E.	in p.c.	in p.c.	in mn t C.E.	in p.c.	mn t C.E.	in p.c.	mn t C.E.	in p.c.
Hard Coal	84.2	82.9	22.2	22.6	— 1.3	— 1.5	82	17	38	14
Soft Coal (Lignite)	33.1	35.2	8.7	9.6	+ 2.1	+ 6.5	35	7	79	7
Mineral Oil	208.9	188.6	55.2	51.5	— 20.3	— 9.7	221	47	245	44
Natural Gas	38.6	46.5	10.2	12.8	+ 7.9	+ 20.4	87	18	101	18
Nuclear Energy	3.9	4.1	1.0	1.1	+ 0.2	+ 2.5	40	9	81	15
Hydro-Power and Others	9.8	8.9	2.7	2.4	— 0.9	— 9.2	10	2	10	2
Primary Energy Total	378.5	366.2	100.0	100.0	— 12.3	— 3.2	475	100.0	555	100.0

a) Preliminary b) Planned

Source: Extracted and calculated on the basis of data from the Arbeitsgemeinschaft Energiebilanzen and the Extrapolated Energy Programme by the Federal Government.