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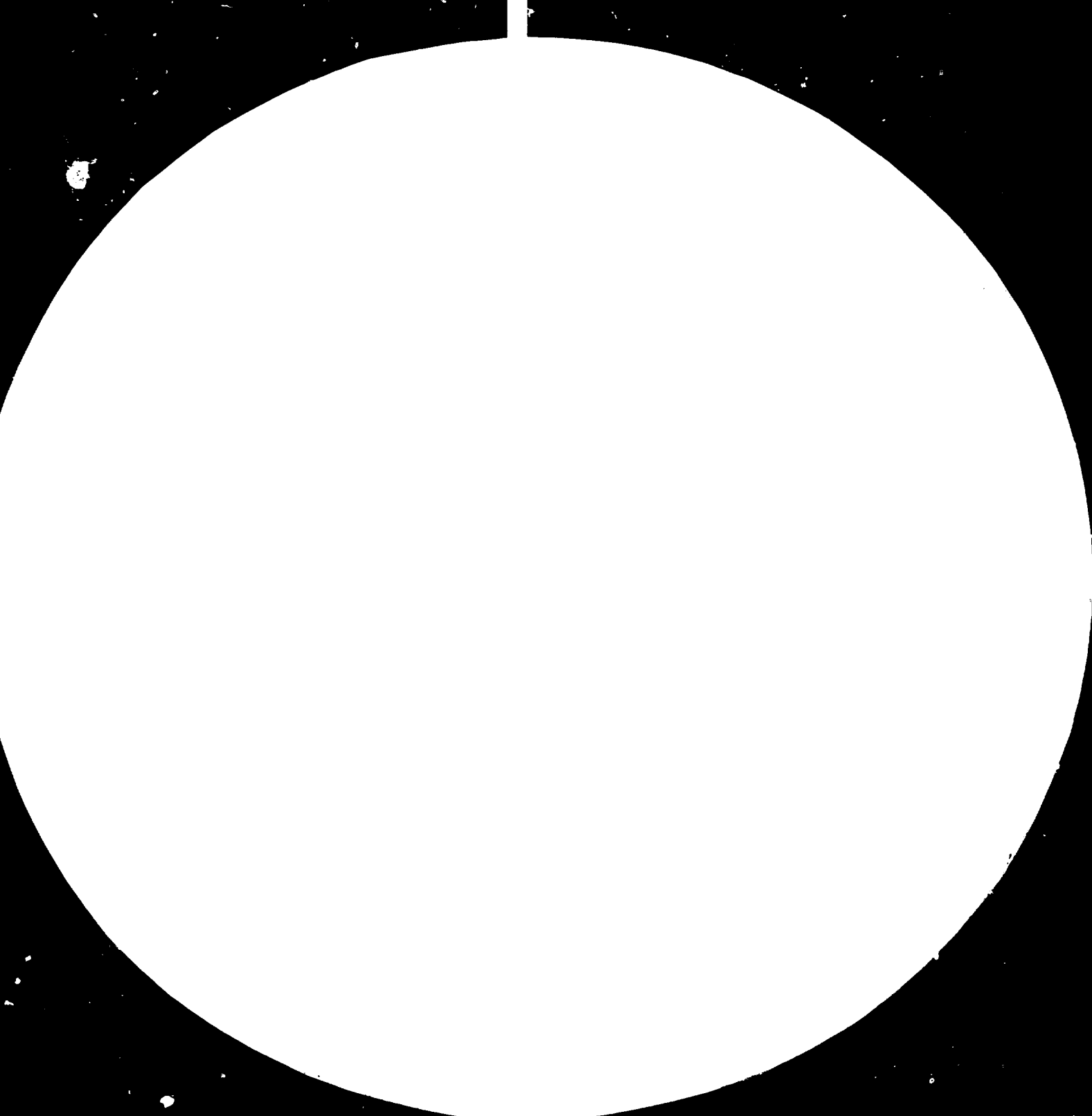

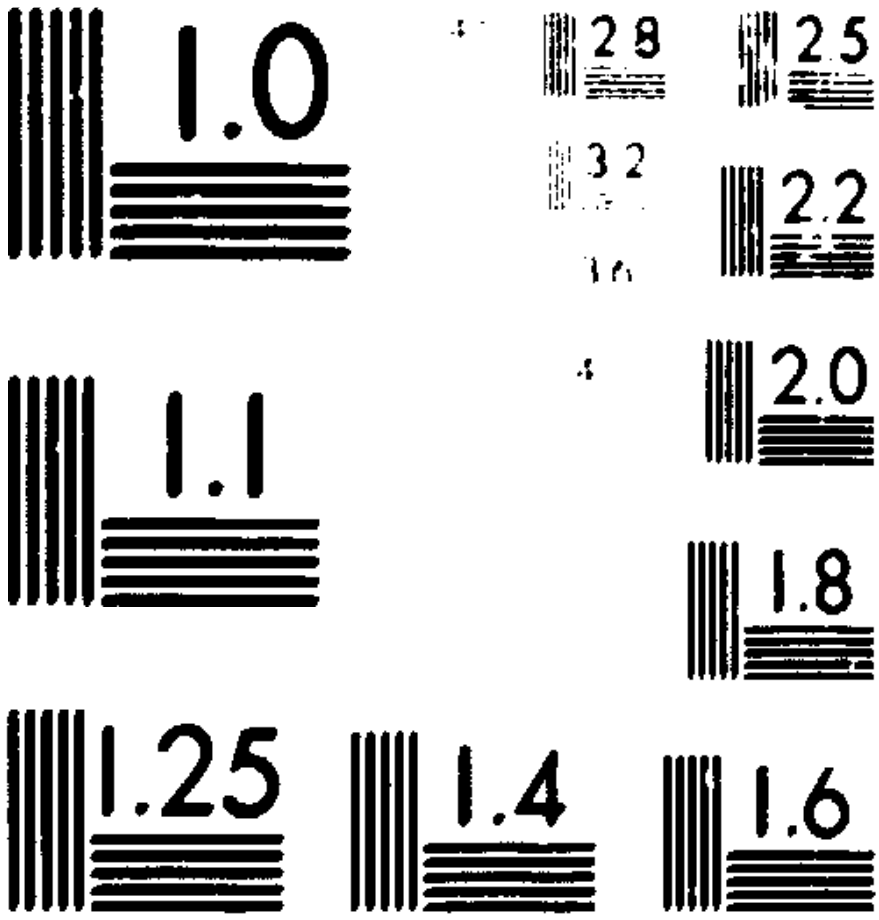

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Third Consultation on the
Iron and Steel Industry

Caracas (Venezuela), 13-17 September 1982

1990 SCENARIOS FOR THE IRON AND STEEL INDUSTRY *

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The group of experts consisted of an executive committee chaired by Messrs Rezki Hocine (Algeria), and Bernt Rollinger (Federal Republic of Germany), co-chairmen, and a small group comprising Messrs Mahieddine Saïdi (Algeria), Josef Miksa (Czechoslovakia), André Signora (France), Minu Nariman Dastur (India), Jovito Martinez Guarda (Venezuela), together with Messrs Emilio Llorens (Argentina), Fritz Kurbisch (Austria), Fred Woods de Lacerda (Brazil), Emanuele Saracino (Italy), Takeshi Katsuhara (Japan), Arturo Navarro Lazcano (Mexico), William Maurice Jamieson (New Zealand), Enrique René Barbis (Peru), Manuel Aguilar Clavijo (Spain), Hans Henrik von Delwig (Sweden), Trakarn Chairat (Thailand), Tugrul Aktutay (Turkey), Oleg Jitnikov (USSR), Tom W. Williams (United Kingdom), Wilson B. Cramer (United States), Dieter F. Anderson(1), Hamdu Amrouche (2) and Julian Makowski(3).

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(1) International Iron and Steel Institute

(2) Arab Iron and Steel Union

(3) Association for Iron Ore Exporting Countries.

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1990 SCENARIOS FOR THE IRON AND STEEL INDUSTRY

Corrigendum

Page 30

The third line from the bottom should read Centrally planned economy developed countries of Eastern Europe

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Contents

INTRODUCTION

FROM THE SECOND TO THE THIRD CONSULTATION ON THE IRON AND STEEL INDUSTRY

A. THE SIGNIFICANCE OF THE THIRD CONSULTATION ON THE IRON AND STEEL INDUSTRY

1. More than five and a half years have elapsed since the First Consultation was organized in Vienna (7-11 February 1977). At that time the dominant prospects were highly optimistic for the future. It was envisaged that the world demand for iron and steel, which had exceeded 700 million tonnes in 1974, would rise to 1,750 million tonnes by the year 2000, and that the contribution of the developing countries to the world production of steel could reach 30%[(1)].

2. The Second Consultation at New Delhi, India (15-19 January 1979), was led to question these long-term prospects. A falling-off in the production of steel could be seen, together with structural modifications in the iron and steel industries of some developed countries, whereas the production of steel in the developing countries had suffered less from the difficulties encountered by the market economy countries. The recognition of inter-dependencies between the developing and the developed countries led to a double re-examination. The continued growth of production capacities of steel in the developing countries was likely to encourage the economy of the developed countries because of the demand for consultation and design services, for capital goods and for special steels. In contrast the economic recession, if it continued for too long in certain developed countries, was likely to be prejudicial to the interest of iron and steel industries of the developing countries[(2)].

Uncertainty as to the long-term development of the world iron and steel industry between now and the year 2000 led the Second Consultation to recommend the construction of intermediate scenarios up to the year 1990, based on various hypotheses and utilising the best economic data available[(3)]. To this end a Working Group consisting of appropriate experts from the developing countries, the developed countries and the interested international organizations, was formed.

3. The Third Consultation at Caracas (Venezuela), will be principally concerned with discussing the intermediate 1990 prospects and examining those measures which, according to the New Delhi recommendation (ID/224, para 2.5) "should optimize the interests of the developed and developing countries in the iron and steel industry".

4. The development which has taken place during the last three years has settled some of the uncertainties and has provided answers to some questions raised during the Second Consultation. It now seems clearer that a prolongation of the economic recession in some developed countries has had contagious effects which have begun to affect the iron and steel industries in some of the developing countries.

This development led the Working Group, at the conclusion of a series of studies submitted to it by the UNIDO Secretariat, which has benefited from its observations(4), to select two contrasted scenarios from the seven scenarios envisaged: one termed "low growth", which prolongs recent trends, the other termed "normative" which expresses a deliberate policy of reversal of the trend towards a slowing down of the growth in the iron and steel industry in the developing countries, whilst remaining within the limits of what is possible.

Briefly, the First Consultation had placed due emphasis on the possibility of the growth of iron and steel industries in the developing countries, that is to say on what was "desirable". The Second Consultation recommended limiting the analysis to the most "probable" development of the sector, taking into account the growing divergence between the "probable" expansion and the "desirable" expansion of the sector in the developing countries. The Third Consultation will direct its work towards examining those means which will make it possible to increase the growth of production in the developing countries to the upper limit of the "possible".

B. CONSTRUCTION OF THE SCENARIOS: THE METHODOLOGY

5. The scenarios are not, by their construction, simple projections based on an extrapolation of trends. Such an approach would in fact be entirely misleading in a changing environment, where the phenomena to be taken into account are becoming increasingly complex and interdependent. Uncertainty in regard to the future can no longer be reflected simply as divergencies from a single trend. The prospective approach, by contrast, accepts that the forecastable future is a multiple one, and it will arise from the confrontation of the various actors involved and their projects. In this way the construction of the future appears to be more the result of human action than pre-determined(5). A scenario is therefore a complex unit formed by the description of a future situation and the pathways of the events which will make it possible to pass from the original situation to the future situation. The method of scenarios places the primary emphasis on the coherence of the hypotheses on which the development of the variables that are being considered are based. These variables are the constraints of the system, together with the means of action which are more or less controlled by the actors operating cooperative or conflicting strategies.

6. The steps followed in drawing up the iron and steel scenarios have been as follows: 1. The analysis of the base and the past trends has been carried out on the basis of the second study of the world iron and steel industry carried out by UNIDO(6) which re-evaluated the development of the iron and steel industry within the framework of the crisis, considered new aspects and identified the problems regarding future trends; 2. A "1985 image" was sketched out, having as its function the creation of a stage for a 1990 perspective and to reduce the uncertainties by identifying the principal variables operating during the period 1980-1985 and beyond(7); 3. The 1990 projects for iron and steel investments in the developing countries were listed. They formed an essential input for drawing up the scenarios, the objective of which was to evaluate the conditions under which these projects could be realised, cancelled or, on the contrary, extended; 4. The structural matrices concern the study of the relationships of the variables to each other. The iron and steel industry has been considered as a system in relation, upstream and downstream, with a physical, economic, social and political environment. External and internal variables structure

the iron and steel industry, according to different degrees of interdependence. Some of them appear as motive variables of the system, others are more influenced than influencing. Some variables are more stable than others. The iron and steel system is therefore susceptible of becoming destabilized. One structure then succeeds another structure(8). These analyses have contributed towards detecting the key-variables and the development hypotheses intrinsic to the iron and steel industry; 5. "Dossiers"(9) were drawn up according to a set of key-variables selected by the small group of experts 6. The development hypotheses for the principal variables were then formulated; 7. Utilization of the global macro-economic scenario made it possible to mark out the ground for the development of the environment external to the iron and steel industry; 8. Hypotheses of macro-economic and socio-political developments were combined with hypotheses covering specific developments in the iron and steel industry. In order to reduce the number of possible scenarios only those hypotheses were considered which have a discretionary effect on the iron and steel projects in the developing countries: for example the absence of financing; 9. Amongst the numerous scenarios which could be envisaged the scenarios which were retained could in this way be reduced to 7. These scenarios, which were not drafted in advance, have been deducted from the configurations resulting from combinations of the hypotheses; 10. It is from amongst these scenarios that a selection was made by the small group of experts(10), retaining two scenarios: one of "low growth" and the other "normative" These two scenarios, which were then examined by the Working Group(11) and which are set out in the following pages, are therefore the result of successive adjustments and close collaboration with the Working Group formed as a result of the Second Consultation(12). Both scenarios take into account the situation of the iron and steel industry in 1982(13), the characteristics and trends of which are analysed on the following pages.

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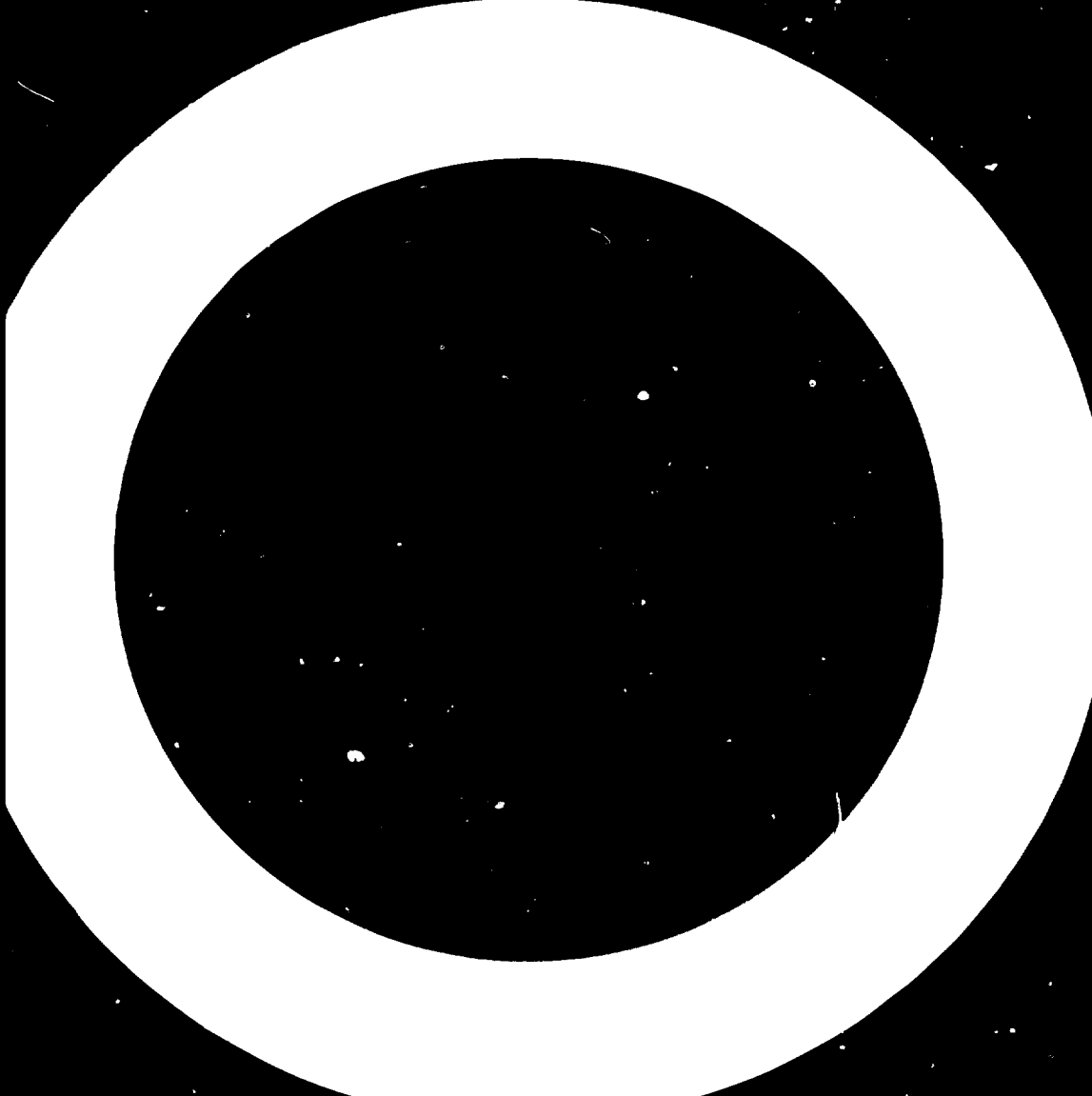

A BASIS FOR REFLECTION ON THE 1990 SCENARIOS

IRON AND STEEL INDUSTRY IN 1982: THE SITUATION AND TRENDS

Quantitative development of the demand

7. The first meeting of the Working Group was held at Algiers in 1979 at the end of a year which, after 1978, marked a period of considerable recovery for the iron and steel industry and which made it possible to hope that the worst period was over.

The first version of the scenario was drafted at the beginning of 1981, at a period when, despite fall in world production in 1980, there were hopes for a recovery of the American economy, with some experts even predicting a "shortfall" of steel for 1984 and 1985.

It is true that in 1976 a shortfall of steel for 1980 had already been forecast and that, during the course of this same year 1976, it was forecast that the production capacities in the European Economic Community would reach a level of 220 million tonnes by 1980.

8. In actual fact the world iron and steel industry continued to experience, in 1982, a globally depressed situation, showing a break from the year 1974 onwards, with the rapid growth during the period 1950-1974.

Table 1. Production of crude steel - World

in millions tonnes

1950	191.6
1960	346.4
1965	454.0
1967	497.2
1968	529.8
1969	574.6
1970	595.4
1971	582.6
1972	630.3
1973	698.4
1974	709.0
1975	645.4
1976	676.4
1977	675.4
1978	717.1
1979	747.8
1980	717.0
1981	707.5

The world production of crude steel was practically static from 1974 to 1981, falling in fact from:

709 million tonnes in 1974

to 707 million tonnes in 1981,

whereas during the previous seven years it had increased by more than 40% (about 5% per year), increasing from:

497 million tonnes in 1967

to 709 million tonnes in 1974.

9. The evolution of world production is characterized by a general slowing-down which has appeared progressively in the major world groups.

10. In the European Economic Community, iron and steel activity has never ceased to be considerably depressed.

The levels of production and consumption of steel in 1981 were at a considerably lower level than those achieved in 1970:

Table 2

	1970	1974	1981
	(in millions tonnes crude steel)		
Production	137.5	155.5	126.3
Consumption	123.4	121.5	101.9

Source: IISI (International Iron and Steel Institute), Brussels.

In-depth restructuring operations continue to affect the British, Belgian and French iron and steel industries; they also affect the German and Dutch industries. The losses suffered by the British, Belgian, French and Italian iron and steel industries not only remain at a disturbing level, but they also tend to affect the German industry.

The "220 million tonnes for 1980" (as put forward in 1976) is now a completely abandoned objective. Even if 1990, or a later date, is considered, it is no longer a question of exceeding 200 million tonnes capacity but, rather of becoming established below that level.

11. In the United States, the hoped-for recovery in 1981 did not take place; instead, it gave way to a deep depression to the point that, in the iron and steel industry, "1982 will probably be the worst year since the Second World War for the larger companies"(14).

This resulted in a considerable pressure on prices and reduced profits, and including the working of mini-steel plants which had to reduce their operating levels and which met increasing competition. Furthermore the falling price of oil was reflected in a marked weakening of the profitable and advancing market for tube products(15).

In this context of crisis the system of trigger prices, established in 1977 but withdrawn in 1980, was re-established in force in October 1981 and then suspended again in January 1982. Many complaints were made by American iron and steel companies against various foreign iron and steel companies (on the basis of dumping or subsidies contrary to GATT) so that they could face up to the rising imports which, in 1981, represented 22.8% of national deliveries or 19,898,340 tonnes.

Pleas were put forward that the American iron and steel industry should be given the opportunity of again satisfying the national demand in the coming years. However it seems, at the present time, improbable that there will be, during the 80's, any significant expansion in the iron and steel industry in the United States(16).

12. The activity of the Japanese iron and steel industry, which declined in 1981 as compared with 1980, has not recovered the record level achieved in 1973:

Table 3.

(in millions of tonnes crude steel equivalent)

	1973	1977	1981
Production	119,322	102,405	101,676
Consumption	87,181	58,253	71,500

Japanese exports, which are still at a very high level, also declined from 36 million tonnes in 1976 to somewhat less than 29 million tonnes during the course of the last financial year.

The Japanese iron and steel industry has considerable excess capacity. It is no longer a question of the capacity, or even of using it at an effectively improved operating level. Medium-term production forecasts have, on the contrary, been revised downwards. The production objective for 1985 is now being fixed at around 115 million tonnes of crude steel equivalent instead of the 125 million tonnes as previously forecast. It should be noted that this objective is still considerably lower than the level reached in 1973.

13. The slowing-down of the iron and steel activity has also extended to the centrally planned economy Eastern European countries:

Table 4.

(in millions of tonnes crude steel equivalent)

Eastern European countries, including the USSR	1970	1974	1978	1981
Production	147.6	185.0	210.9	207.0
Apparent consumption	151.7	188.9	212.7	204.0

E (estimate)

Source: IISI

The development of production in these various countries indicates that an inflection of the trend appeared in 1976, 1977 or 1978.

Table 5. (in millions of tonnes crude steel equivalent)

	1977	1981
Bulgaria	2,589	2,600
Hungary	3,723	3,600
Poland	19,250 *	15,600
Czechoslovakia	15,294 *	15,200
USSR	151,436 *	149,000

* = 1978

According to the available information, this development reflects a modification in the policy of a rapid extension of production capacities (quantitative), together with a move towards more qualitative policies based on the modernization of the installations (change from Martin furnaces to LD converter, extension of continuous casting) and on their more productive utilization.

14. This slowing-down has finally, sometimes in a brutal manner, affected the developing countries.

. The reduction in the activity of the Brazilian iron and steel industry between 1980 and 1981, and then between the first months of 1981 and of 1982, is spectacular. Brazilian production has in fact fallen from 15.3 to 13.2 million tonnes of crude steel, a reduction of 13.9% between 1980 and 1981 (source: IISI). It continued to fall by 22.9% between the first two months of 1981 and the corresponding months of 1982[17]. This is the first reverse which the Brazilian iron and steel industry has experienced for many years.

. Consumption of steel in the Republic of Korea, which increased rapidly from 1.279 million tonnes in 1970 to 7.438 million tonnes in 1978, fell to 6.10 million tonnes in 1980 (source: IISI).

. Domestic consumption of steel has been falling in Venezuela for several years, from 2.6 million tonnes in 1977 to 2.23 million tonnes in 1981.

. Domestic demand for steel has also fallen in Mexico between January/February 1981 and January/February 1982 (-0.3%), whereas the new Mexican plan for the development of the iron and steel industry up to 1990 forecasts an average rate of growth of the consumption of 10.1% per year.

. By contrast, a considerable increase marks the development of production and consumption in the People's Republic of China and the Democratic People's Republic of Korea since 1970, though at the end of the period the demand seems to have become static in thes countries also.

Table 6.

	1970	1974	1978	1981
Production				
People's Republic of China	18.0	26.0	31.7	35.6
Democratic People's Republic of Korea	2.2	3.2	5.0	5.5
TOTAL	20.2	29.2	36.7	41.1
Consumption				
People's Republic of China	22.5	29.8	42.7	
Democratic People's Republic of Korea	2.2	3.4	4.2	
TOTAL	24.7	33.2	46.9	46.0

Source: IISI

15. Even if the growth of the domestic demand for steel in the developing countries should, according to certain forecasts, pick up considerably during 1982, it seems that the sometimes brutal reductions in production and consumption in several developing countries are not isolated incidents, but form part of a movement of greater size which the comparison of rates of growth of demand 1971 - 1977 on the one hand and 1977 - 1981 on the other, highlight:

Table 7. Development of the domestic demand for steel

	1971	1977	Mean annual rate of growth %	1977	1981	Mean annual rate of growth %
	Tonnes crude steel			Tonnes crude steel		
Africa (excluding South Africa)	3.6	6.3	9.8	8.66	8.6	8.1
Latin America	20.0	30.5	7.3	30.50	36.2	4.4
Asia (excluding Japan)	16.15	32.9	12.6	32.90	38.4	3.9
Middle East	5.6	13.0	15.1	13.02	16.0	5.3
TOTAL	45.35	82.7	10.5	85.08	99.2	4.6
People's Republic of China (PRC) + Democratic People's Republic of Korea (DPRK)	26.57	35.6	5.0	35.6	46.0	6.6
TOTAL developing countries, including PRC and DPRK	71.92	118.3	8.4	120.68	145.2	4.7
of which: Argentina	3.7	3.6	-0.5	3.6	2.7	-6.9
Other Asian countries	0.75	4.0	32.2	4.0	5.5	8.3
Brazil	7.4	12.0	8.4	12.0	13.4	2.8
Korea (Rep. of)	1.3	5.7	27.9	5.7	6.8	4.5
India	6.4	10.2	8.1	10.2	12.8	5.8
WORLD TOTAL	582.5	675.0	2.5	675.4	715.2	1.4

Source: IISI - Steel Statistical Yearbook 1980
- Steel Statistics 1982

16. Production of steel in the developing countries has followed a parallel development:

Table 8. Development of the production of crude steel.

	1971	1977	Mean annual rate of growth %	1977	1981	Mean annual rate of growth %
	Tonnes crude steel			Tonnes crude steel		
Africa (excluding South Africa)	0.58	1.22	13.2	1.22	1.20	-0.4
Latin America	14.0	22.0	7.8	22.0	26.96	5.2
Asia (excluding Japan)	7.95	21.92	18.4	21.92	27.34	5.7
Middle East	0.55	2.54	29.0	2.54	2.86	3.0
TOTAL	23.08	47.68	12.8	47.68	58.36	5.2
People's Republic of China (PRC) + Democratic People's Republic of Korea (DPRK)	23.36	27.7	2.9	27.7	42.1	11.0
TOTAL developing countries, including PRC and DPRK	46.44	75.38	8.4	75.38	100.46	7.4
of which: Argentina	1.91	2.68	5.8	2.68	2.58	-1.0
Other Asian countries	0.47	1.77	24.7	1.77	3.14	15.5
Brazil	5.99	11.25	11.1	11.25	13.21	4.1
Korea (Rep. of)	0.47	4.37	45.0	4.37	10.75	25.2
India	3.82	10.0	8.6	10.0	10.78	1.9
WORLD TOTAL	582.55	675.43	2.5	675.43	707.59	1.2

Source: IISI - Steel Statistical Yearbook 1980
- Steel Statistics 1982

It would seem that, in the developing countries (excluding the People's Republic of China and the Democratic People's Republic of Korea), the reduction in the rate of growth between 1971-1977 on the one hand, and 1977-1981 on the other, is somewhat more marked in production where the level has fallen from 12.8% to 5.2%, or -7.6 points, than in the case of the consumption where the rate fell from 10.5% to 4.6%, or -5.9 points.

17. This slowing-down is taking place in a world economic context which has been characterized, amongst other things:

- by financial difficulties caused by the rise in interest rates and their consequences on the reimbursement of debts;
- by the fall in the price of oil, which has adversely affected the cash resources and the plans of several oil exporting countries.

This has been reflected in particular by:

- delays in the realization of projects,
- reductions in programmes,
- the freezing or cancelling of certain projects:

. In Brazil, where the Acominas project has experienced rising costs and major delays, and where other projects are at the present time frozen, such as Usiminas Phase IV.

. In Argentina, where the modernization plans of Somisa have experienced financing difficulties.

. In Venezuela, where the Zulia project, finally accepted by the Fondo de Inversiones de Venezuela, has been reduced for the present, to a single rolling mill for medium-sized sections and a coke plant.

. In Peru, where the plans for the extension of Siderperu have been reduced, the production capacity objectives being reduced from 0.72 to 0.52 million tonnes[18].

. In Tunisia, where the announcement of the decision concerning the extension of the capacities of the El Fouladh unit have been delayed; in Egypt the decision concerning the construction of the Dekkheila unit has been similarly delayed.

. In Mexico the considerable slowing-down in the demand for steel at the beginning of 1982 took place at the moment when oil receipts were falling and when the national currency was devalued by 40%, whereas the Mexican iron and steel plan forecast that the demand for steel would increase from 9.858 million tonnes in 1981 to 23.574 million tonnes (crude steel equivalent) in 1990[19].

. In the Republic of Korea, where the preparatory studies and work for the opening of the second integrated complex have been somewhat delayed.

18. The recent evolution of the world iron and steel industry from 1977 to 1981 therefore shows an inflexion in the rate of growth of both production and consumption of steel as compared with the period 1971-1977.

Whereas up to 1977 the nil growth of the iron and steel industry in the industrialized market economy countries was compensated for by the growth of the iron and steel industry in the centrally planned economy countries, and particularly in the developing countries, a new trend can be seen from 1977 onwards where only a slowing-down of growth of iron and steel production in the developing countries compensates for a nil growth not only in the market economy countries but also, taken overall, of the centrally planned economy countries. The question therefore arises of knowing whether this trend is accidental, temporary or possibly of a more lasting character.

Qualitative evolutions

19. What is currently called the crisis does not have exactly the same significance for each of the iron and steel industries affected by it. What for some years now has been termed "restructuring" does not have the same content, for example, for the European iron and steel industry, for the American iron and steel industry or for the Japanese iron and steel industry.

. In Europe the situation is tending to become more serious, including in the German iron and steel industry; investments there have fallen to a very low level (in constant value), falling from $2,824 million in 1977 to $2,695 million in 1981 (forecast).

. By contrast,in the United States the profits of the iron and steel industry increased considerably up to the time when the recent recession reduced them. The seven leading iron and steel companies realized a cumulative net profit of US$ 548 million in the second quarter of 1981 (+92% as compared with the first quarter of 1980) and US$ 1,031 million for the first quarter of 1981 (+59% as compared with the first quarter of 1980). The situation of certain companies shows the vigour of their reactions to the new context: National Steel, for example, the Detroit plant of which remains profitable with an operating level which is still below 60% as a result of a systematic modernization effort.

. The difference is even more marked in favour of the Japanese iron and steel companies, as can be seen in Table 9 on the following page, even if the 1981 results have shown a reduction as compared with 1980.

It can be seen, in particular, that the results of the Japanese companies have very considerably improved as compared with 1978, whilst the levels of utilization of their capacities remain low.

The capacity for adaptation and adjustment of the Japanese iron and steel industry has made it possible to exceed the level of profits achieved before 1975,with operating levels which are, however, considerably lower. Before 1975 it was necessary for the operating level to exceed 80% before profits appeared; from 1978 onwards higher profits were recorded with operating levels which approached 60%. Japanese iron and steel industry is precisely the one which has abandoned any extensive projects in order to place the emphasis quite deliberately on modernization, intensification and the production of high value added quality products.

20. It is therefore in Japan, and also in the United States, that a recovery of investments in the iron and steel industry in 1981 can be seen.

In 1981 the American iron and steel firms made public their investment projects, reaching a total of US$ 5,600 million. By their very size these projects showed a positive development as compared with previous announcements (Table 10).

Table 9. Operating results and net results in the United States, Europe and Japan

	Operating results 1980		Net results % on turnover		
	% on turnover	US$ per tonne of steel	1978	1979	1980
United States					
US Steel	0.7	2.8	2.2	-2.3	4.0
Bethlehem Steel	6.9	41.9	3.6	3.9	1.8
National Steel	3.6	20.6	3.0	2.9	0.8
Republic Steel	7.1	42.7	3.2	3.0	1.4
Inland Steel	5.2	32.3	4.9	3.6	0.9
Armco Steel	5.6	27.3	4.6	4.9	4.7
Europe					
Thyssen AG	0.7	2.5	1.6	1.7	1.3
British Steel	-22.6	-125.9	-8.0	-17.6	-23.4
Italsider	5.6	27.7	-13.4	-8.3	-19.5
Usinor (*)	-3.9	-17.0	-13.6	-8.6	-7.2
Sacilor (*)	-10.7	-40.6	-10.5	-12.6	-18.1 (**)
Krupp	2.9	41.1	-0.2	0.9	0.7
Arbed	4.3	14.5	-5.1	-0.5	-3.5
Salzgitter	1.8	19.3	-1.4	-0.1	-1.0
Mannesmann	3.1	51.9	2.0	1.2	1.4
Japan					
Nippon Steel	7.9	36.5	1.9	3.7	2.3
Nippon Kokan	12.3	60.9	0.9	1.9	2.6
Sumitomo Metal	12.3	61.9	1.5	3.2	3.6
Kawasaki Steel	14.9	69.0	1.8	4.4	4.7
Kobe Steel	10.6	80.0	1.6	2.5	2.3

(*) not consolidated

(**) The Krupp results were negative in 1981

Source: OSI (Observatoire des Stratégies Industrielles) - Paris - note - December 1981

Table 10. Evolution of total investments in the American iron and steel industry

(in US$ millions)

	1971	1975	1977	1978	1979	1980	Forecasts 1981	1982	1983
US Steel	452	787	865	668	979	753	900*	1000*	
Bethlehem Steel	306	688	552	412	418	506	450*	600*	750*
LTV			90	133	326	242	202		
Republic Steel	62	200	155	211	341	346	320*	310*	360*
National Steel	114	314	164	122	200	265	180*	220*	
Inland Steel	64	208	271	264	284	241	140*	190*	255*
Armco		247	146	210	162	271	400*	515*	
TOTAL			2268	1939	2717	2624	2592 + 3000		

* Kidder, Peabody estimates

Irrespective of the impact of the present recession on the realization of these announcements it is interesting to note that the projects announced may be divided up as follows:

- 50% for modernization programmes or programmes for the installation of equipment intended for production of high quality products: high strength or coated sheets;
- 30% for the production of seamless tubes;
- 20% for the extension of continuous casting.

21. For their part, the Japanese iron and steel companies, which stabilized their investments since 1977, whilst devoting their efforts to reduction of costs and energy, have also re-launched their investments by increasing them by 30% between the 1980-1981 and 1981-1982 financial years:

Table 11. Evolution of total investments in Japanese iron and steel companies (in billions Yen)

	1977	1980	1981	Forecasts 1982	1983	1984
Nippon Steel	283	170	165	210	200-250	200-250
Nippon Kokan		182	48	100		
Sumitomo Metal Ind.	206	63	101	136	150-160	150-160
Kawasaki Steel		51	72	125	130	
Kobe Steel		43	62	68		
Total		496	448	639		
Other producers			190	191		
TOTAL Japan			638	830		

Source: OSI Note - Paris, December 1981

These investments relate essentially to modernization actions, together with the promotion of high value added products, like:

- seamless tubes, the capacity of which should increase from 3.9 million tonnes in 1980 to 5.7 million tonnes in 1983;
- [illegible] coated sheet, the production capacity for which should be increased by 1.5 million tonnes per year from 19[illegible]984.

22. The re-launching of investments does not therefore relate to the extension of iron and steel production capacities (with some exceptions) either in the United States or in Japan; it is presented, on the contrary, in the form of intensive modernization actions and the search for a higher value added more sophisticated quality products.

The Japanese explained that, after the years 1974-80, which constituted a stage of adjustment, the 1980's will mark the entry into a process of technical intensification, succeeding the period of extensive production which was interrupted by the 1974 crisis(20).

23. The dynamism of the process results from the double constraint of economizing on energy and, more generally, of economizing on raw materials. This is reflected, in particular, by an accelerating reduction in the specific consumption of steel.

. Between 1970 and 1977 in the Federal Republic of Germany it can be seen that the specific consumption fell:

- from 412 to 370 kg of steel per 1,000 kg of electrical machinery
- from 873 to 668 kg of steel per 1,000 kg of shipbuilding products
- from 612 to 557 kg of steel per 1,000 kg of rail rolling stock
- from 883 to 783 kg of steel per 1,000 kg of threaded goods.(21)

. In France the mean reduction in the specific consumption of steel exceeded 2% per year. This reduction is very noticeable in the car industry, where it is likely to be accelerated even further when new models with a low fuel consumption (3 litres per 100 km or 80 mpUSg) are launched in Europe, possibly from the end of the 80's.

The reduction in the specific consumption results both from:

- the replacement of steel by lighter materials (aluminium and plastics materials)
- qualitative change, now operating within the iron and steel production apparatus itself, where ordinary steels are progressively giving place to steels of higher quality: high strength carbon steels, steels of high or, more frequently, low alloy content.

As compared with 1973 (index = 100), the consumption of all steels in the EEC reached an index of 90 by 1978, whereas the consumption of fine and special steels in the same year reached an index of 97.8. This trend, which also results from the predominance of productivity investments over capacity investments, is even more clearly marked in Japan where the consumption of fine and special steels (October/December 1973 = 100) reached an index of 122.9 at the end of 1978 instead of an index of 84.8 for ordinary steels.(22) The size of such a change gives a plausible character

to the forecast according to which the service given by one tonne of rolled steel in the year 2000 will correspond to the same service given by two tonnes of rolled steel in 1974.(23)

The same applies in the USSR where the utilization of high quality steels, either carbon steels or low alloy steels, has made it possible to affect economies in the weight of metal of more than 25% by weight.(24)

24. In this way the activity of the iron and steel industry is marked by quality imperatives.

These imperatives are imposed firstly under the effect of the constraining requirements for economies in respect of energy and raw materials. Automation, continuous working, and tighter controls have as their effect not only to economize on energy and raw materials but also to achieve better and more consistent quality in production. The search for energy economies is reflected in the promotion of quality.

These imperatives are also imposed by the effect of the increasing demands of users. To the demands of the oil companies, which have been established for many years and which are reflected by stringent standards to which the producers of tubes have to conform (quality of the sheets and the welds), is now added, and more pressingly since the energy crisis, the demands of numerous other users: manufacturers of cars, for example, seeking lighter but stronger sheet, or sheet which has better corrosion resistance.

The iron and steel industry has ceased to be a sellers' market, imposing its production and conditions on the buyers, and has now become an industry where producers can only sell their products if they correspond precisely to the needs of the users.

Within this context the effective linking of production to the domestic market implies, amongst other things, the implementation of sales networks which are sufficiently dynamic and technically competent, requiring

- to know the users,
- to evaluate their quantitative and qualitative requirements,
- to orientate their choices,
- and finally to specify, by joint agreement, the desired or desirable improvements.(25)

25. This development poses the problem of a new differentiation between:

- the so-called advanced iron and steel industries, integrated, multi-valent and offering mass high quality products, and
- the new iron and steel industries in the developing countries taking those steps which pass from the phase of extensive production to the phase of intensification of quality and added value.

As the City Bank Bulletin has emphasized: "it is precisely on the rapid development of techniques, which improve the flexibility of operation of installations and which reduce costs, that competition on the world steel market has today been relaunched".(26) The process of differentiation can be seen at several levels: not only between the iron and steel industries of the older industrialized countries and the newer iron and steel industries of the developing countries, but also within the same group of industrialized countries between the more advanced and the others which have been more affected by the crisis.

The impact of this development is felt directly in the iron and steel production itself, since iron and steel installations can only operate under satisfactory cost, price and cash-flow conditions by producing high quality products in quality. The increasing profits of the Japanese groups, during the 1979-1980 financial year, despite their low operating levels, result from this situation and also from the relatively high level of prices in the domestic market.

The iron and steel industries of the developing countries themselves find it difficult to escape the consequences of the quality imperative. Certainly it is not necessary that the production of concrete reinforcing rods or small sections should meet high standards to be satisfactory. By contrast

any iron and steel products which are exported must meet the international standards, as must also the iron and steel products integrated into the goods exported such as ships, cars, machines or equipment. In the same way that it is impossible to produce oil and gas pipelines if the sheets used do not meet the API standards[27], there is a risk that it will become difficult in the developing countries to advance in the production of capital goods without using iron and steel products of an increasingly high quality. The future of the iron and steel industry is largely linked to the converting of its products to form metal articles, capital equipment and machinery. This has led the Soviet experts to state that "the improvement of the quality of the metal is of the highest importance for all countries, including the developing countries".[28]

26. The iron and steel industry is in the process of becoming a "quality industry", offering less "all-purpose" products than products of high value added.

This means that the iron and steel industry is in the process of becoming an industry with a high level of skills. The Japanese basic steelworker is now of matriculation level. This is a very clear indication of the conditions which are now being imposed not only on the new iron and steel industries in the developing countries[29] but also on other and much older iron and steel industries. The crisis in the industry is both a crisis of quality and a crisis of skills, both individual and collective; it requires, from this point of view, the implementation of in-depth transformations. The result of this is that the extension of the industry to new areas (the South, that is to say the developing countries) cannot be carried out without reference to the most advanced iron and steel industries of the "North", which are now accelerating the rate of their intensive modernization.

27. In conclusion, and whether the inflection in the trend, in particular in the developing countries, is a passing one or more lasting, the imperatives of the intensification of production, quality and higher skills will in any case be imposed. The scenarios, the objective of which is to reflect the development of the iron and steel industries in the developing countries up to 1990, must take this into account.

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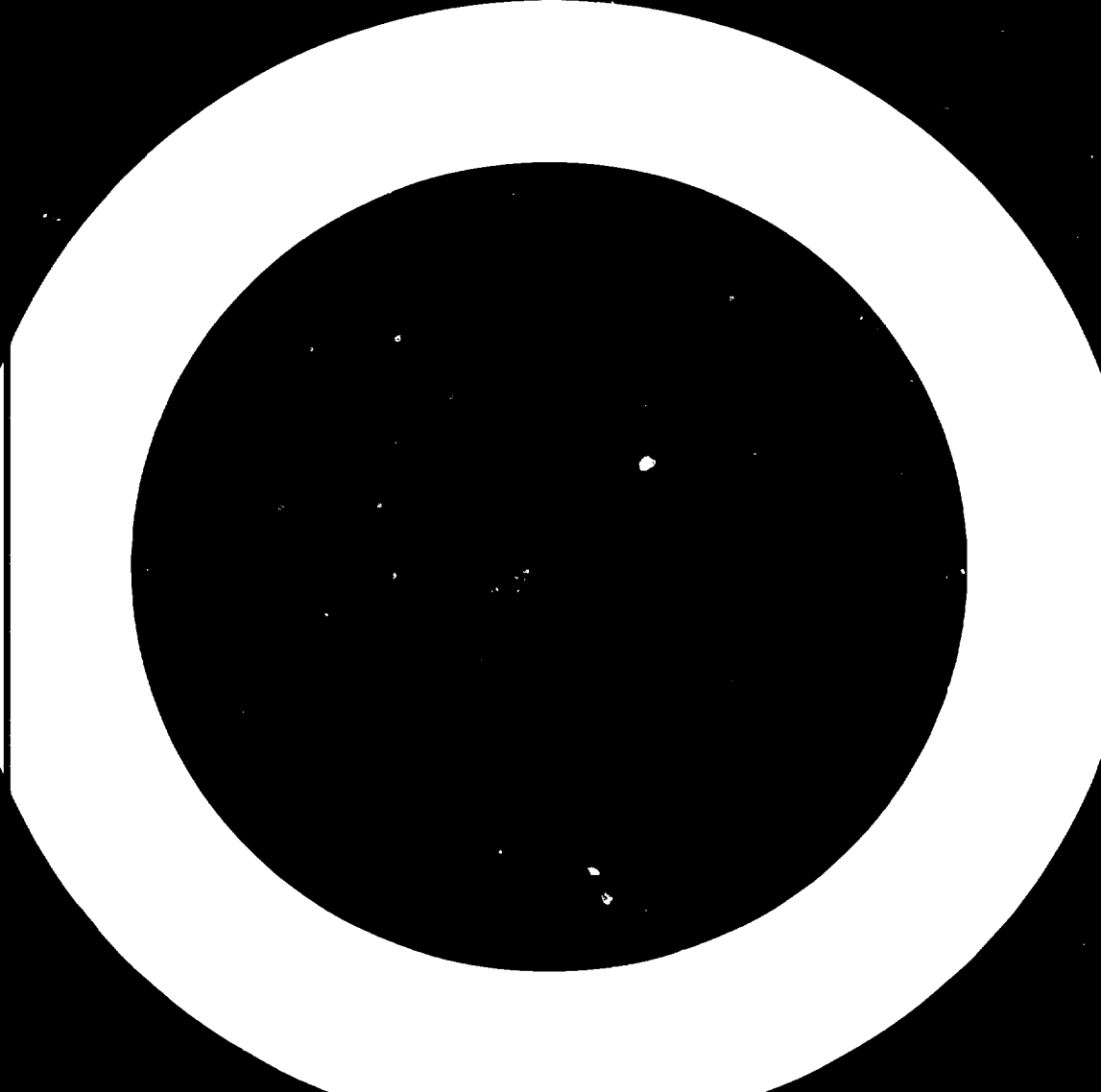


THE ALTERNATIVE SCENARIOS

A. A SCENARIO OF LOW GROWTH

The general hypotheses

28. The low growth scenario forms part of the trend towards a slowing-down of iron and steel production activity noted during recent years since 1976-1977. This slowing-down, after it had affected the iron and steel industries in the market economy developed countries since 1974, has progressively affected firstly the centrally planned economy Eastern European countries, then the developing countries.

This scenario is based on the hypothesis that the trends which operated during the recent period will remain preponderant up to the end of the 80's; the factors contributing to this slowing-down of the growth of iron and steel activity are the following:

- the continuation, in many developing countries, of a high level of indebtedness, contributing towards mobilizing major resources for servicing debts;
- the contraction of available international credits for the developing countries, because of the reduction in the oil surpluses to be recycled;
- a certain flattening-out of rising prices of energy, even if a return to the period of cheap energy is excluded;
- the rising relative prices of equipment goods and services in relation to the price of iron and steel products;
- the sluggishness in growth of product manufacturing, in particular, in principal steel-using sectors

29. The global scenarios which were proposed, some years ago, by several international organizations opened up generally optimistic perspectives on the growth of the world economy and, in particular, of the economy of the developing countries during the 80's. The scenarios of Interfuturs[30], Leontieff[31] and UNIDO (in September 1980)[32], put forward the following hypotheses:

Table 12. Mean annual rate of growth of the GNP (Gross national product)

	Interfuturs (***)				Leontieff		UNIDO
	A	B_2	C	D	OEO (**)	NIEO (*)	Normative
Developed countries	4.5	3.8	2.8	3.7	3.9	3.6	3.7
Developing countries	6.5	6.0	5.35	6.0	5.4	6.9	7.3
World	5.0	4.4	3.5	4.3	4.2	4.5	4.5

(*) based on the lower hypothesis of the United Nations population forecasts
(**) continuation of past trends for the developed countries
(***) Scenario A : Consensus giving rise to high growth
B_2 : Scenario of moderate convergent growth
C^2 : North-South confrontation scenario
D : Protectionist scenario

NIEO = New International Economic Order
OEO = Old Economic Order

The most pessimistic hypotheses in regard to the economic growth of the developing countries were therefore proposed by the Interfuturs scenario C: 5.35% per year (North-South confrontation scenario) and by the Old Economic Order scenario of Leontieff: 5.4% per year.

30. The hypotheses proposed by recent scenarios have become less optimistic.

UNIDO has reevaluated its projections downwards, taking into account world developments. The so-called "trend" [33] scenario has been drawn up in collaboration with UNCTAD; this is not, however, a crisis scenario (UNITAD project). It envisages, in fact, the following rates of growth over the period 1980-1990:

	Mean rate of growth of the GNP	Mean rate of growth of value added of the manufacturing industries
Developed countries	3.2%	4.1%
Developing countries	5.2%	5.6%
World	3.6%	4.3%

The IIASA[34] scenario contains a hypothesis which forecasts the following evolutions:

	Mean annual rate of growth
Developed countries	2.8
Developing countries	4.0
World	4.1

The lower scenario proposed by the World Bank[35] in its 1981 report also shows similar evolutions:

Developed countries	2.8
Developing countries	4.6
World	3.9

Finally the scenario proposed in the last annual report of UNCTAD[36] estimates that the lower scenario of the World Bank is itself very optimistic inasfar as "a rapid return to the former rates of economic growth is not probable in the near future. However, the World Bank's assumptions in this respect appear to be somewhat optimistic, particularly in view of the outlook for 1981-1982. For example, assuming an annual average rate of world growth of 1.8 per cent in 1981 and 1982, the World Bank's "low" scenario would require that the developed market-economy countries achieve an annual average rate of about 3.1 per cent for the remainder of the decade. In the light of the problems facing these economies, it is unlikely that even the "low" assumption will prove realistic unless policies change significantly."

This has led UNCTAD to propose the following projection for the decade 1980-1990:

	Mean annual rate of growth
Market economy developed countries	2.4
Communist countries of Eastern Europe	3.5
Developing countries	4.2

These prospects for growth for the developing countries are therefore more pessimistic than in all the other scenarios with the exception of the lower ILASA scenario. On this subject the UNCTAD report explains that this projection "reflects the constraints on the volume and terms of financing that are expected for developing countries in the 1980s. With respect to private financial flows it is already clear that many developing countries have reached the point where they cannot afford further financing of their deficits on non-concessional terms and are adjusting to the current recession through a curtailment of imports and a slackening of growth."

The UNCTAD report emphasizes the unacceptable character of such a scenario which would result in an increase in unemployment and in political problems which would be difficult to overcome. It will however be noted that the trend scenario of UNCTAD is more pessimistic than the Interfuturs scenario C, qualified however as a North-South confrontation scenario. This means that the trend scenario is now being purely and simply superimposed on the so-called crisis scenarios.

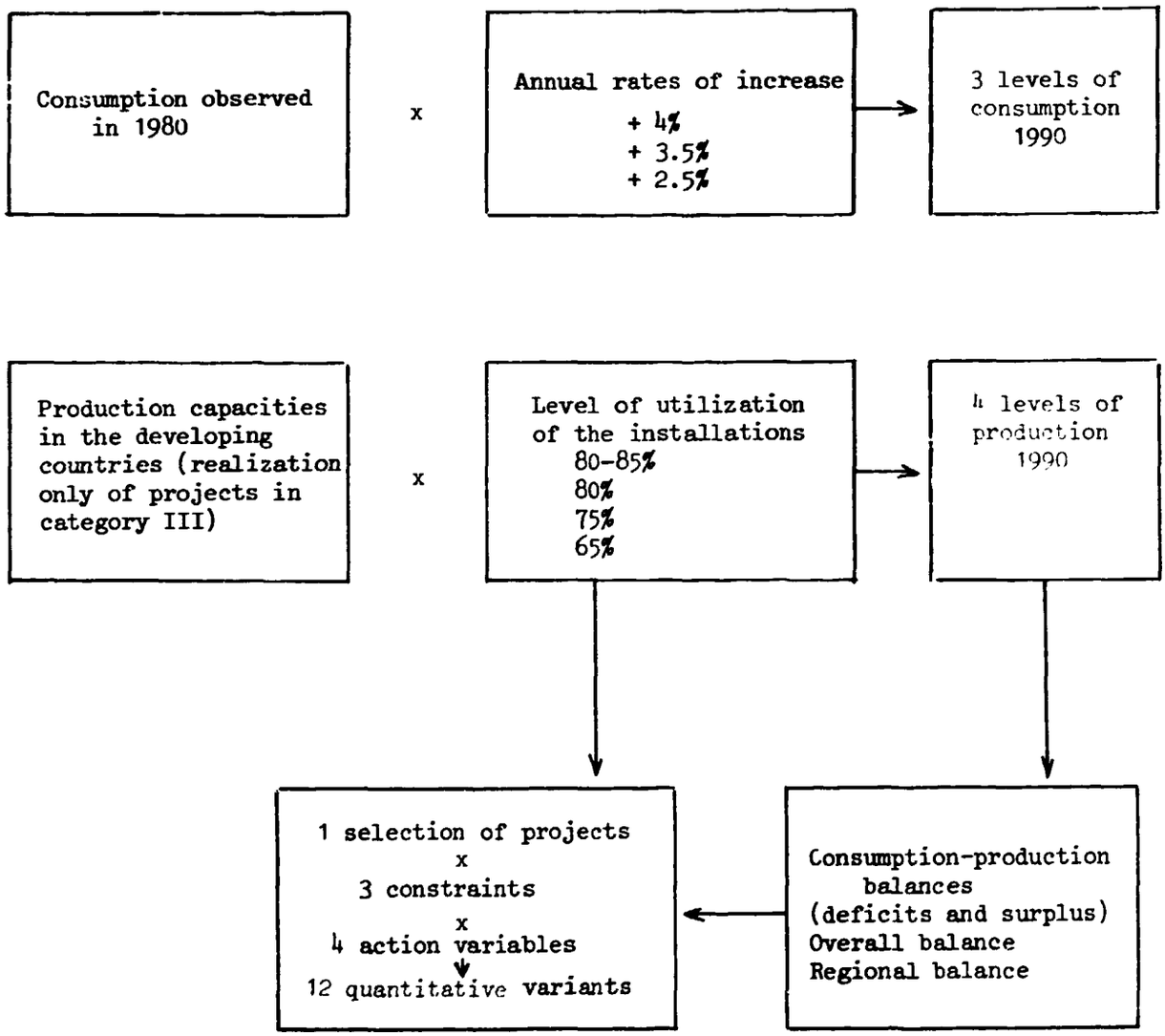
In this context a trend scenario of low growth for the iron and steel industry during the decade 1980-1990 may be retained as a plausible scenario.

31. The scenario of low growth of the iron and steel industry during the decade 1980-1990 is formed by the combination of hypotheses relating to

- the selection of realizable investment projects, taking into account the financial constraints and the level of demand,
- the operating levels of the installations,
- the rates of increase of the demand (see diagram below)

Apart from the initial selection of projects, the rates of growth of the demand are constraints which fall outside the initiative of the industry, whereas the operating levels of the installations are liable to be modified on the basis of the policies defined and the actions of companies.

Combinations of hypotheses for the low growth scenario



This scenario results in quantitative estimations which provide several images of futures possible within a general framework of slowing down of the iron and steel demand, together with the reduction in the number and extension of the iron and steel projects.

Projects retained and production capacities

32. In this scenario the financial constraints and the perspectives for a slowing down demand for steel are reflected by the realization, during the period, of only:

- those projects already under construction,
- those projects now being launched,
- those projects which have been the subject of a firm decision and financial support - or a first draft of support,

that is to say projects belonging to category III (see Dossier I).

33. In the four regions retained the projects belonging to category III correspond with the following production capacities (see Annex 1 - Tables 41, 42, 43 and 44).

. In Africa South of the Sahara:
7 projects in 3 countries with a capacity of 3.3 million tonnes

. In North Africa + Middle East:
10 projects in 7 countries with a capacity of 9.7 million tonnes

. In Latin America:
34 projects in 12 countries with a capacity of 28.1 million tonnes

. In Asia:
24 projects in 11 countries with a capacity of 22.4 million tonnes.

This makes a total of 75 projects in 33 countries with a production capacity of 63.5 million tonnes.

34. The total production capacities available in 1990 would, under these conditions, be as follows:

Table 13

(in millions of tonnes raw steel)

	Available capacities in 1980	New production capacities installed between now and 1990	Total
Africa South of the Sahara	1,250	3,270	4,520
North Africa and Middle East	5,750	9,690	15,440
Latin America	35,000	28,120	63,120
Asia	34,000	22,400	56,400
TOTAL	76,000	63,480	139,480

On the basis of operating levels of 80%, 75% or 65% the steel production would be as follows:

Table 14.

(in millions of tonnes crude steel)

	Production capacities 1990	Productions obtained Level of utilisation 80%	75%	65%
Africa, south of the Sahara	4.520	3.61	3.4	2.9
North Africa and Middle East	15.440	12.35	11.6	10.0
Latin America	63.120	50.50	47.3	41.0
Asia	56.400	45.12	42.3	36.7
TOTAL	139.480	111.58	104.6	90.6

36. As compared with the production of steel obtained in 1980 this would represent, according to the operating levels retained, the following increases:

Table 15. Comparison of 1980 and 1990 productions at various levels of utilization

	1980 production, millions tonnes	1990 Productions					
		at 80%(1)		at 75%(2)		at 65%(3)	
		mt.	% annual rate	mt.	% annual rate	mt.	% annual rate
Africa, South of the Sahara	0.95	3.61	14.3	3.4	13.6	2.9	11.8
North Africa and Middle East	3.38	12.35	13.8	11.6	13.1	10.0	11.5
Latin America	28.97	50.50	5.7	47.3	5.0	41.0	3.5
Asia	24.46	45.12	6.3	42.3	5.6	36.7	4.1
TOTAL	57.76	111.58	6.8	104.6	6.1	90.6	4.1

The annual increase in production, relatively large, would be 6.8% under hypothesis 1 (80%), 6.1% under hypothesis 2 (75%) and 4.1% under hypothesis 3 (65%).

37. On the basis of the supplementary hypothesis that the new capacities would not be utilized at the same rate as the capacities installed in 1980, and by allocating respectively to these various categories of installations respective levels of utilization of 85% (capacities installed in 1980) and 75% (new capacities) a result very similar to the result obtained with a uniform rate of utilization of 80% is obtained, that is to say 108.82 million tonnes instead of 111.58 million tonnes. By contrast if under the highest hypothesis (H_1) a rate of utilization of 80% is allocated to the iron and steel industries of Africa and the Middle East, and a rate of 85% to the already more advanced industries of Asia and Latin America, the following results are obtained:

Table 16

(in millions of tonnes crude steel)

	1990 production 85% and 80%	Annual rate of increase since 1980
Africa, South of the Sahara	3.61	14.3
North Africa and Middle East	12.35	13.8
Latin America	53.65	6.4
Asia	47.94	7.0
TOTAL	117.55	7.4

On this mixed hypothesis the increase in production between 1980 and 1990 would be 7.4% per year.

The consumption

38. The low growth scenario depends on the central hypothesis under which the development in the demand for steel during the decade would be a continuation of the recent trend (1977-1981), characterized by an annual rate of increase of 4%.

This rate of 4% has been retained, within the framework of this scenario, as the upper limit for the increase in the consumption of steel in the developing countries.

The hypothesis of an extension of the structural crisis, which now affects the iron and steel industries of several developed regions, and to certain developing countries has led to retaining the lower levels of 3.5% and 2.5%.

The following table shows the different levels of consumption arising from this:

Table 17. Development of Steel consumption

(in millions of tonnes crude steel)

	1979 demand	1990 Demand according to the various hypotheses		
		4% A	3.5% B	2.5% C
Africa, South of the Sahara	4.33	6.67	6.32	5.68
North Africa and Middle East	18.47	28.43	26.96	24.23
Latin America	33.60	51.73	49.05	44.09
Asia	36.15	55.65	52.78	47.43
TOTAL	92.55	142.48	135.12	121.43

China and the Democratic People's Republic of Korea

39. This analysis would be incomplete if it did not take into account the development prospects of the iron and steel industries of the People's Republic of China and the Democratic People's Republic of Korea. The available information does not make it possible to formulate definite hypotheses, as in the case of the other developing countries; one can, however, refer here to some data relating to the development of the iron and steel industries in this region:

Table 18. The iron and steel industry of the People's Republic of China
Production and external trading.

	Production	Imports	Exports
1970	17.78	2.66	0.21
1971	21.31	2.33	0.31
1972	23.38	2.35	0.52
1973	25.21	4.08	0.56
1974	21.11	3.74	0.45
1975	23.90	4.00	0.41
1976	20.45	4.93	0.33
1977	23.74	5.25	0.22
1978	31.78	8.63	0.33
1979	34.48	8.47	0.36
1980	37.12	5.00	0.39

Source: China's Iron and Steel Industry - Past, present and future
Zhang Xinshuan, Ma Benshi, Hu Zhaoliang,
written at the invitation of UNIDO, 1981.

In 1981 production will be 35.6 million tonnes, the reduction in production being smaller than forecast.

The capacity for crude steel production, equal to about 40 million tonnes in 1980, should increase after 1985 at the end of a period of readjustment. Some uncertainty relates to the rate of this increase.

As to the Democratic People's Republic of Korea its production capacity should rise during the 80's to about 7 million tonnes of crude steel.

For 1990, therefore, it would seem to be prudent to assume a total production capacity of about 60 million tonnes for the People's Republic of China and the Democratic People's Republic of Korea. Such capacities would undoubtedly only make it possible to meet a relatively moderate increase in consumption with some difficulty, so that the People's Republic of China is likely to remain a major importer during the decade 1980-1990.

The consumption-production balances (*)

40. On the basis of the various hypotheses the following summary balances have been established (see Table 19: The low growth scenario in orders of magnitude - page 39).

Observations and conclusions

41. The low growth scenario is constructed on the coherence of the following hypotheses:

- realization only of projects already started;
- low rate of growth of the demand;
- differential utilization of the installed capacities.

The combinations of these hypotheses are reflected in a wide diversity of results, and the significance of these should be analysed.

(*) China and the Democratic People's Republic of Korea excluded.

Table 19. The low growth scenario in orders of magnitude

I. Rate of increase in the demand = 4%	1990 demand	1990 Production				Balance			
		80/85% (1)	80% (2)	75% (3)	65% (4)	(1)	(2)	(3)	(4)
Africa, South of the Sahara	6.67	3.61	3.61	3.40	2.90	- 3.07	- 3.07	- 3.27	- 3.77
North Africa and Middle East	28.43	12.35	12.35	11.60	10.00	-16.08	-16.08	-16.83	-18.43
Latin America	51.73	53.65	50.50	47.30	41.00	+ 1.92	- 1.23	- 4.43	-10.73
Asia	55.65	47.94	45.12	42.30	36.70	- 7.71	-10.53	-13.35	-18.95
TOTAL	142.48	117.55	111.58	104.60	90.60	-24.93	-30.90	-37.88	-51.88

II. Rate of increase in the demand = 3.5%	1990 demand	1990 Production				Balance			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Africa, South of the Sahara	6.32	3.61	3.61	3.40	2.90	- 2.71	- 2.71	- 2.92	- 3.42
North Africa and Middle East	26.46	12.35	12.35	11.60	10.00	-14.61	-14.61	-15.36	-16.96
Latin America	49.05	53.65	50.50	47.30	41.00	+ 4.60	+ 1.95	- 1.75	- 8.05
Asia	57.78	47.94	45.12	42.30	36.70	- 4.84	- 7.66	-10.48	-16.08
TOTAL	135.12	117.55	111.58	104.60	90.60	-17.57	-23.54	-30.52	-44.52

III. Rate of increase in the demand = 2.5%	1990 demand	1990 Production				Balance			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Africa, South of the Sahara	5.08	3.61	3.61	3.40	2.90	- 2.07	- 2.07	- 2.28	- 2.78
North Africa and Middle East	24.23	12.35	12.35	11.60	10.00	-11.88	-11.88	-12.63	-14.23
Latin America	44.09	53.65	50.50	47.30	41.00	+ 9.56	+ 5.41	+ 3.21	- 3.09
Asia	47.43	47.94	45.12	42.30	36.70	+ 0.51	- 2.31	- 5.13	-10.73
TOTAL	121.43	117.55	111.58	104.60	90.60	- 3.88	- 9.85	-16.83	-30.83

42. a) First result: in all cases the production-consumption balance shows an overall deficit.

This deficit ranges from 4 million tonnes (rate of increase in the demand 2.5% and operating levels of 85/80%) to 52 million tonnes (rate of increase of the demand 4% and operating level of 65%).

The deficit, which was 28 million tonnes in 1979 (imports 35.7 million tonnes - exports 7.7 million tonnes), would be aggravated in six cases out of twelve:

- with a hypothesis of an increase in the demand of 4%, and with operating levels of 65%, 75% and 80%;
- with a hypothesis of an increase in the demand of 3.5%, and with operating levels of 65% and 75%;
- with a hypothesis of an increase in the demand of 2.5%, and with an operating level of 65%.

The deficit would, however, be reduced in six cases out of twelve:

- each time the operating level reached 80/85%;
- with a hypothesis of a growth of the demand of 3.5% and 2.5% and with an operating level of 80%;
- also with a rate of growth of the demand of 2.5% and an operating level of 75%.

It will be seen, therefore, that as operating levels improve, and as the management of the iron and steel industries in the developing countries becomes better, so imports would become smaller and the opportunities for exports from the iron and steel industries of the developed countries will become more limited. Under a low growth scenario, good management of the iron and steel industries in the developing countries tends to make competition on the international market more acute.

b) Second result: it can be seen that exportable surpluses tend to appear every time the deficit is reduced to a considerable extent.

Exportable surpluses ranging from 4 to 9.5 million tonnes appear in Latin America:

- each time the operating level reaches 85%;
- with an operating level of 80% under demand growth hypotheses of 3.5% and 2.5%;
- with an operating level of 75% under the demand growth hypothesis of 2.5%.

A small exportable surplus can also be seen in Asia on the hypothesis of an increase in demand of 2.5% and an operating level of 85%.

It is obviously the hypothesis which combines the lowest rate of growth in the demand with the best operating levels which results in the maximum exportable resources. When the weighted investment costs are added to the weakness of the demand, resulting from a general sluggishness of the economy, this will lead to developing iron and steel exports so as to improve the rate of utilization of the plants and hence their competitiveness.

Such a perspective would be a clear reversal of the trend, in so far as imports into the developing countries, before flattening out at the end of the 70's, increased for many years more rapidly than their exports, resulting in a worsening deficit in these countries.

Table 20. Imports and exports from the developing countries

(in millions of tonnes crude steel equivalent)

	Africa, South of the Sahara		North Africa + Middle East		Latin America		Asia		Total	
	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp
1970	2.02	-	3.72	-	3.35	1.24	8.17	1.38	17.26	2.62
1972	1.47	-	5.32	-	5.09	1.37	7.65	1.40	19.53	2.77
1974	2.09	-	9.64	-	9.71	0.81	10.93	1.96	22.37	2.77
1976	2.07	-	12.16	-	6.02	0.85	9.51	3.41	29.76	4.26
1978	2.49	-	12.38	-	7.50	2.16	14.51	3.68	36.88	5.84
1979	1.90	-	12.37	-	6.45	2.60	14.38	5.20	35.10	7.80

Source: IISI

Such a reversal of the trend would be very strongly felt by the iron and steel industries in the developed countries, in particular those of Europe and Japan, since imports into the developing countries in 1979 (including imports by the People's Republic of China, but excluding internal EEC and CMEA trading) represented 44.5% of all world imports.

This reversal would not be improbable, given the rapid growth of exports from some Latin-American and Asian steelworks.

Table 21. Development of exports from some Latin-American and Asian Iron and Steel Industries

(in millions of tonnes crude steel)

	Brazil	Venezuela	Republic of Korea	Other Asiatic countries
1975	0.164		0.931	0.249
1976	0.143		1.354	0.283
1977	0.232		1.246	0.314
1978	0.560	0.071	1.631	0.894
1979	0.826	0.166	3.188	1.520
1980	0.915	0.231	5.269	0.824
1981		0.388	6.239	0.910

Sources: IISI and COFRANSID (French group for the construction of iron and steel complexes)

These exporters still, however, remain major importers:

Table 22. Imports into some Latin-American and Asian countries
(in millions of tonnes crude steel)

	Venezuela	Republic of Korea	Other Asiatic countries
1975	1.31	1.67	0.93
1976	1.57	1.70	1.35
1977	2.51	2.51	1.65
1978	1.30	3.53	1.90
1979	1.14	2.67	2.06
1980		2.81	2.86
1981	0.98	1.82	2.75

Sources: IISI and COFRANSID

c) Third result: in all cases Africa and the Middle East are the most disadvantageous regions; their deficit is half their consumption or higher.

d) Fourth result: Africa and the Middle East are also the regions where the projects realised within the framework of the low growth scenario are most unequally distributed between steelworks producing long products and steelworks producing flat products.

Table 23. Breakdown of production capacities into long and flat products, by regions.

(in millions of tonnes crude steel)

	New product capacities (1)	Of wnich flat products (2)	% flat products (2)/(1)
Africa, South of Sahara	3.27	0.5	15.3
North Africa and Middle East	9.69	3.0	30.95
Latin America	28.120	17.4	61.8
Asia	22.400	12.[illegible]	56.2
TOTAL	63.480	34.[illegible]	53.6

Whilst Latin America and Asia tend towards a distribution of their production capacities between long and flat products which is similar to that obtaining in the advanced iron and steel industries, Africa and the Middle East have to compensate for the weakness of their flat production capacity by imports which remain massive in this field; their imports of long products are, however, being considerably reduced.

e) Fifth result: the low growth scenario does not favour the entry of new arrivals into the iron and steel industry, in particular small countries having small projects but which cannot offer solid guarantees to possible suppliers of credit.

In this scenario

- only six "new entrants" can be seen, including:

  2 in Africa South of the Sahara,
  2 in North Africa and the Middle East,
  2 in Latin America, but
  none in Asia,

- whilst 45 countries continue to lack any iron and steel installations, including:

  25 in Africa South of the Sahara,
  7 in North Africa and the Middle East,
  6 in Latin America, and
  7 in Asia.

f) Sixth result: it is clear that the operating levels achieved have a very considerable influence on the results.

Moving from an operating level of 65% to one of 80/85% means a difference of 27 million tonnes production, whereas moving from the hypothesis of the lowest rate of growth of the demand to a hypothesis of high demand is only reflected in:

- a production difference of 13.7 million tonnes between the 2.5% hypothesis and the 3.5% hypothesis,
- and a production difference of 21 million tonnes between the 2.5% hypothesis and the 4% hypothesis.

B. THE NORMATIVE SCENARIO

The general hypotheses

43. The normative scenario - the result of discussions in the Working Group - is not a maximalist scenario. A scenario would, for example, be maximalist which envisaged the completion by 1990 of more investment projects than those projects actually listed, together with the entry into the iron and steel industry of a larger number of countries as compared with those who are proposing at the present time to enter it.

But it is normative in the sense that it tends towards a future which differs from that implied by recent trends, and that it is subordinate to corrections of the possible projections and to a political desire for realisation and of international cooperation, whilst always remaining within the limits of the possible.

The normative scenario is that which tends to the realisation of the projects announced by the developing countries, that is to say to the installation of a new capacity of 117 million tonnes.

This means that there will be added, to the new capacities of about 63 million tonnes, which are felt to be realisable in the low growth scenario (and which correspond to the projects now being realised or on the way to immediate realisation), a new tranche of 54 million tonnes (corresponding to those projects now being negotiated or of the stage of initial feasibility or pre-feasibility studies)(37).

The scenario is also normative in the sense that it is intended to avoid the aggravation of the divergence in development and of inequalities between the developing countries, so as to promote better cooperation between them. In this way 15 countries would enter into iron and steel production, and to these should be added 17 countries where the weakness of existing installations means that they should be included with the previous ones: there are therefore 32 newly arrived countries as against 6 in the low growth scenario.

Finally the scenario is normative since it envisages the construction of plants which operate and which, by utilising the installed capacities to the best advantage, ensure an economic surplus. It therefore conforms to the

recommendation of the Second Consultation on the Iron and Steel Industry which felt that "The characteristics of the world iron and steel industry require an understanding of the preparations needed for the mobilization of substantial resources to obtain results in the medium term"(38).

44. As a function of these aims the hypotheses retained within the framework of the normative scenario are the following:

. The developing countries, as a result of a deliberate policy and reinforced international cooperation, could have capacities for technical assimilation and the organization of iron and steel units which were sufficient for efficient mastery of their projects.

. The financing constraint, which was discriminant in the low growth scenario, is assumed to be lifted.

. The demand for iron and steel products increases in the developing countries. This constraint, external to the iron and steel industry, is assumed to have evolved fairly favourably so as to encourage the realisation of projects now under negotiation or in the study stage, including pre-feasibility studies.

A normative scenario must therefore be compatible with a more sustained growth of the economy, more particularly of the industrial sector.

It should be pointed out, however, that this linkage is neither rigid nor mechanical. A country having natural and financial resources can decide to go forward despite the sluggishness of the iron and steel market, speculating on a recovery during the nineties. The example of India in the fifties shows that a country may implement a deliberate policy without, however, subordinating its decisions solely to the medium term prospects for the markets.

45. With this proviso the normative scenario for the iron and steel industry in 1990 may be inserted within the general framework formed by the recent UNIDO model entitled the "International Development Strategy" (IDS).(39) The utilization of this model has made it possible to prepare three global scenarios: a trend scenario and two scenarios termed IDS 1 and IDS 2(40).

The IDS 2 scenario seems to be more compatible with the problems of the iron and steel industry and the projects of the developing countries where the "North-South" relationships are seen to have a determinant weight.

The essential macro-economic hypotheses for the IDS 2 scenario of the UNIDO/UNCTAD model for 1980-1990 are as follows:

Table 24

	Rate of growth of GNP(*)	Rate of growth in manufacturing value added
Developed countries	3.5%	4.4%
Developing countries	6.3%	6.9%
of which . Tropical Africa	4.8%	6.5%
. Latin America	6.3%	6.5%
. East Asia	7.0%	7.9%
. West Asia	7.8%	8.3%
. South Asia	5.0%	6.1%
. Centrally planned economy countries of Asia	6.0%	-
World	4.0%	4.6%

(*) GNP = Gross National Product

These macro-economic hypotheses have served as the reference points when defining hypotheses on the growth of the demand for iron and steel products.

46. The normative scenario is constructed on the basis of hypotheses which concern:

- The realization of investment projects.
  This assumes that the financing constraint has been lifed, as a result of reinforced international cooperation;
- the rate of growth of the demand (external constraint);
- the operating rates of the installations, capable of being modified as a function of company actions and policies;
  Better operating levels assume favourable internal conditions, but also an improvement in international cooperation to transfer technical management capabilities.

The scenario makes it possible to obtain eight quantitative estimates, which offer as many images of the possible futures, within a general framework of improvement both in the demand for iron and steel products and in the realization of projects in the developing countries. (See diagram on following page.)

Production capacities

47. In this scenario all the iron and steel projects identified are realized, including those projects which are still at the initial study stage (categories III, II and I).

This represents:

- in Africa south of the Sahara:
  32 projects with a capacity of 9.2 million tonnes;
- In North Africa and the Middle East:
  26 projects with a capacity of 19.3 million tonnes;
- In Latin America;
  42 projects with a capacity of 46.9 million tonnes
- In Asia:
  38 projects with a capacity of 41.5 million tonnes.

In total: 138 projects with a capacity of 116.9 million tonnes.

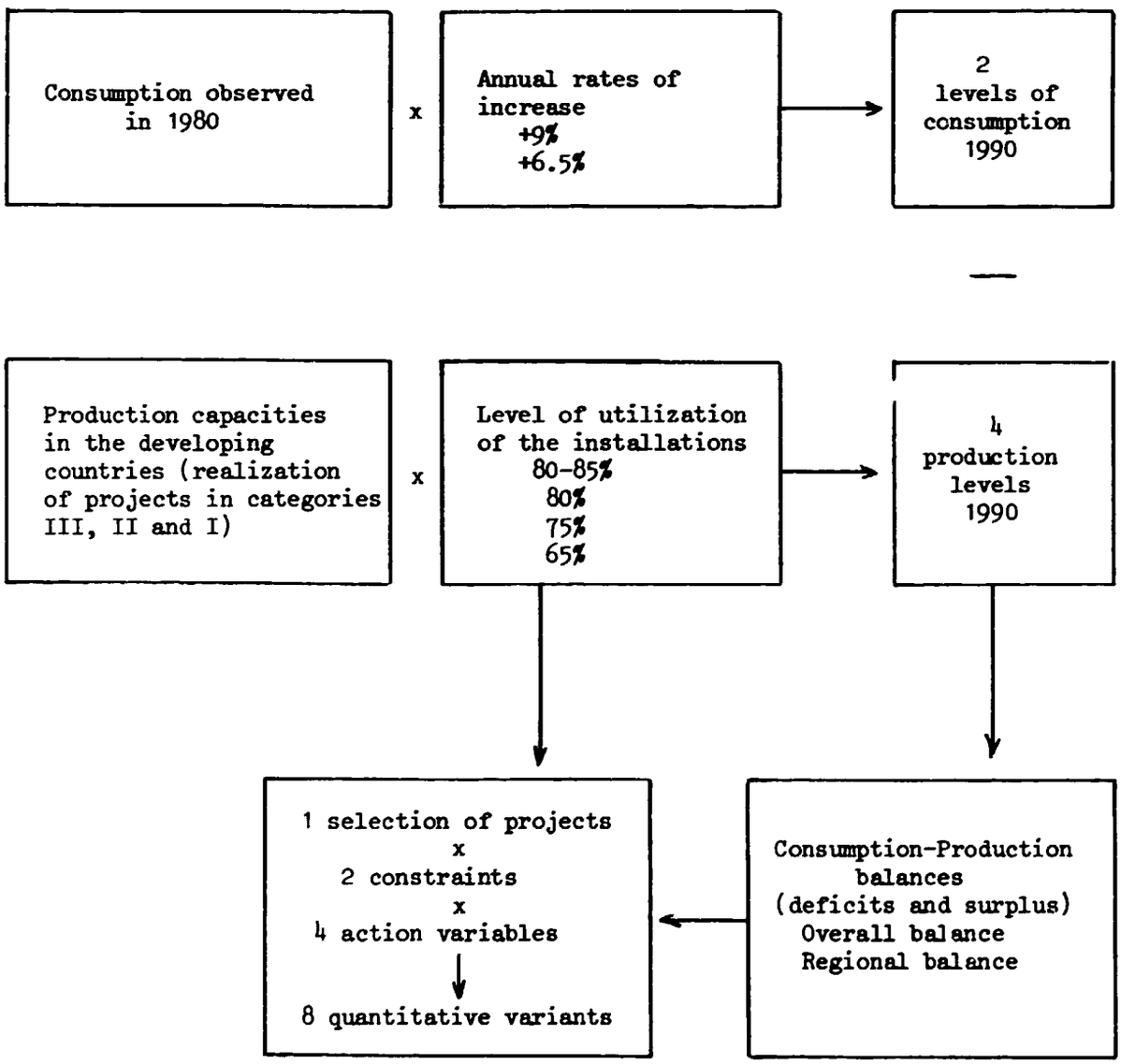
The total production capacities available in 1990 would, consequently, be as follows:

Table 25.

(in millions of tonnes crude steel)

	Capacities available in 1980	New production capacities installed between now and 1990	Total
Africa South of the Sahara	1,250	9,200	10,450
North Africa and Middle East	5,750	19,300	25,050
Latin America	35,000	46,900	81,900
Asia	34,000	41,500	75,500
TOTAL	76,000	116,900 (rounded to 117,000)	192,900 (rounded to 190,000)

Combinations of hypotheses for the normative scenario



Operating levels and 1990 production

48. In the same way as for the low growth scenario, four hypotheses of operating levels have been considered: 85-80% (85% for the industries of Asia and Latin America, 80% for the industries of Africa and the Middle East), 80%, 75% and 65%.

This gives the following production of steel in 1990:

Table 26.

(in millions of tonnes crude steel)

	Production capacities 1990	Production obtained			
		80-85%	80%	75%	65%
Africa South of the Sahara	10,450	8.37	8.37	7.85	6.80
North Africa and Middle East	24,050	20.04	20.04	18.79	16.28
Latin America	81,900	69.61	65.52	61.42	53.23
Asia	75,500	64.18	60.40	59.63	49.08
TOTAL	191,900	162.20	154.33	144.69	125.39

49. As compared with the production of steel achieved in 1980 this would represent, as a function of the various hypotheses on utilisation rates, the following increases:

Table 27. Comparison of 1980 and 1990 production at various utilisation rates.

	1980 production tonnes	1990 production							
		at 85-80%		at 80%		at 75%		at 65%	
		t.	% annual rate	t.	% annual rate	t.	% annual rate	t.	% annual rate
Africa South of the Sahara	0.95	8.37	24.3	8.37	24.3	7.85	23.5	6.8	21.7
North Africa and Middle East	3.38	20.04	19.5	20.04	19.5	18.79	18.7	16.28	17.0
Latin America	28.97	69.61	9.2	65.52	8.5	61.42	7.8	53.23	6.3
Asia	24.46	64.18	10.1	60.40	9.5	56.63	8.8	49.08	7.2
TOTAL	57.76	162.20	10.9	154.33	10.3	144.69	9.6	125.39	8.1

The annual increase in the production would, on these hypotheses, range from 8.1% to 10.9%.

Consumption

50. In the normative scenario the demand for steel would again increase rapidly.

Quantification of relationships between the growth of the economy, the growth of industry and the growth of the iron and steel industry presents special difficulties in the case of this scenario. The coefficients of elasticity which link to the consumption of iron and steel products to income levels in the least developed countries, new entrants into the iron and steel industry, are inadequately known(41). However it appears that the consumption of steel depends less on economic growth than on growth in those branches with activities which utilise steel. Within the latter the demand varies according to the nature of the investment and according to the equipment and goods which are produced(42). Unfortunately we do not possess sufficient information on investment projects outside the iron and steel industries in the countries concerned to make a rigorous quantification possible. Finally in the case of the most advanced countries the utilization of curves of iron and steel intensity encounter the same difficulties as in the developed countries.

For all these reasons the regional differences in the rate of macro-economic growth in the UNIDO IDS 2 scenario cannot at the present time be translated into elasticity coefficients specific to the iron and steel industry. We have therefore retained only two rates of demand, +6.5% and +9.0%, which seem to be compatible with the rates envisaged for the growth of the economy and the growth in industry.

The following table summarizes the levels of consumption which result:

Table 28. Evolution of the consumption of steel

(in millions of tonnes crude steel)

	1979 demand	1990 demand Hypotheses: 6.5%	9%
Africa South of the Sahara	4.33	8.66	11.17
North Africa and Middle East	18.47	36.92	47.66
Latin America	33.60	67.17	86.70
Asia	36.15	72.27	93.28
TOTAL	92.55	185.02	238.81

The consumption-production balances

51. As a function of these various hypotheses the following summary balances have been drawn up (see Table 29: The normative scenario in orders of magnitude - page 53).

Observations and conclusions

52. The following results may be observed:

a) It can be seen firstly that, in all the variants of this scenario, the production-consumption balance in the developing countries is in deficit. According to the hypotheses this deficit ranges from 23 to 113 million tonnes. It is only on the hypotheses of a rate of growth of 6.5% and with an operating level of 80-85% that the deficit will be smaller than the present deficit. In this case an exportable surplus of 2.4 million tonnes could be found in Latin America. In the seven other cases considered it is greater. In other terms the increase projected in 1990, of 1.5 times the production capacities existing in 1980, would not compensate for the increase in the demand which would double under a hypothesis of a rate of growth of 6.5% and would be multiplied by 2.5 with a rate of growth of 9%.

Table 29. The normative scenario in orders of magnitude

I. Rate of increase of the demand = 9%	1990 Demand	1990 production				Balance			
		80-85% (1)	80% (2)	75% (3)	65% (4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	11.17	8.37	8.37	7.85	6.80	-2.80	-2.80	-3.32	-4.37
North Africa and Middle East	47.66	20.04	20.04	18.79	16.28	-27.62	-28.87	-28.87	-31.38
Latin America	86.70	69.61	65.52	61.42	53.23	-17.09	-21.18	-25.28	-33.47
Asia	93.28	64.18	60.40	56.63	49.08	-29.10	-32.88	-36.65	-44.20
TOTAL	238.81	162.20	154.33	144.69	125.39	-76.61	-84.48	-94.12	-113.42

II. Rate of increase of the demand = 6.5%	1990 Demand	1990 production				Balance			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	8.66	8.37	8.37	7.85	6.80	-0.29	-0.29	-9.81	-1.86
North Africa and Middle East	36.92	20.04	20.04	18.79	16.28	-16.88	-18.13	-18.13	-20.64
Latin America	67.17	69.61	65.52	61.42	53.23	+2.49	-1.65	-5.75	-13.94
Asia	72.27	64.18	60.40	56.63	49.08	-8.09	-11.80	-15.64	-23.29
TOTAL	185.02	162.20	154.33	144.69	125.39	-22.82	-30.69	-40.33	-59.63

In the case of the best utilization of the installations (85-80%), and with a rate of growth of the demand of 9%, the imports of the developing countries (assuming that their exports reach 10 million tonnes) would be of the order of 80 million tonnes, or three times the 1979 level.

It will also be seen that a rate of growth of the demand of 9% envisaged for the period is less than the rate of growth between 1971 and 1977, namely 10.5% per year.

b) Under this scenario the most disadvantaged zones remain Africa and the Middle East where the deficit, as in the low growth scenario, remains equal to half the consumption or more.

c) It can also be seen that the distribution of steelworks between long and flat products remain very unequal according to the region.

Table 30. Contribution of flat products to the new 1990 projects

(in millions tonnes)

	Total capacities (1)	Flat production capacities (2)	% (2)/(1)
Africa South of the Sahara	9.2	1.5	16.3
North Africa and Middle East	19.3	3.5	18.1
Latin America	46.9	27.7	59.0
Asia	41.5	23.1	55.7
TOTAL	116.9	55.8	

The result is that Africa and the Middle East will have to continue to import the greater part of the flat products they need whereas, taken overall, Latin America and Asia will not, in this field, have to call on imports except to supplement ranges which are still incomplete in respect of sizes or grades.

d) One of the characteristics of the scenario is the entry into the industry of fifteen new countries, together with 17 others which can be assimilated to those countries which do not possess any iron and steel industry. However these 32 countries only represent a total capacity of 4.5 million tonnes (of which 0.8 million tonnes would seem to be realized within the framework of a low growth scenario), or 3.8% of the new projected capacities and 2.3% of the total capacities of the developing countries in 1990.

C. OTHER POSSIBLE SCENARIOS

53. Scenarios are not reducing instruments but, on the contrary, they are "machines for prospecting possible futures". This is why it is necessary to go beyond the limits of the configurations set out by the two previous scenarios by developing other combinations between rates of increases in the demand and hypotheses covering production levels.

a) Combination of production levels arising from the scenario of low growth with high rates of growth of the demand of 9% and 6.5% lead to the following results (see Table 31 - page 58).

With a rate of growth of the demand of 6.5% the deficit in iron and steel products in the developing countries, of 67 to 94 million tonnes, would be multiplied by a factor ranging from 2.5 to 3.

With a rate of growth of the demand of 9% this same deficit of 121 to 148 million tonnes would be multiplied, in relation to 1979, by a factor ranging from 4.5 to 5.

The simultaneity of these two contrasted hypotheses, high demand and low rate of growth of the production in the developing countries, means that these would evolve as two independent variables. One may attempt to imagine under what conditions a situation of this nature could arise. It would be necessary firstly that the process of production should be limited by a pessimistic view of market prospects, by restrictions on financial and technical assistance from the developed countries, themselves haunted by the spectre of over-production, and secondly that the economic cycle of the developing countries experience a vigorous advance.

This situation is not improbable, the history of the iron and steel industry does not exclude such failures of adjustment between the demand and the supply. However such a deficit would be unacceptable for the developing countries and it is not certain that the developed countries would be able to supply such quantities at a reasonable price.

The consequence of this would be that the high rate of growth of the demand would be reflected in the rapid realisation of new projects in the developing countries and that the trend would be towards a passage to implementing a normative scenario.

b) Conversely the combination of high levels of production arising from a normative scenario with low rates of growth of the demand of 4% and 3.5% would lead to the following results (see Table 32 - page 59).

On the two hypotheses of 4% and 3.5% the deficit in the developing countries would, in 6 cases out of 12, give place to a surplus which could rise to 27 million tonnes. Again the simultaneity of the hypotheses reflects a failure of adjustment and a monumental error in evaluating the prospects. This situation is not, in principle, insoluble. It is possible to imagine it under the following circumstances. The rates of increase of the demand would rise rapidly in the coming years, but would fall at the end of the period. The short term increase in the demand would encourage the building of the projected steelworks. However, since the present rate of the economic cycle in the developing countries does not suggest a sudden change in the immediate future, this scenario is, in practice, not very probable. The same applies to the situation where, notwithstanding the weakness of the demand, the developing countries undertake, imperturbably, the realization of their projects. It is necessary, for this to happen, that they should have the necessary financial and technical resources.

This new distribution of iron and steel activities, characterised by the existence of exportable surpluses in the developing countries, could also, in theory, be the consequence of a policy of "delocalization" of the iron and steel industry of the "North" towards the "South". However, inasfar as experience has shown that the proposals for delocalization already announced have never been realized it is more probable that a low rate of increase in the demand would rapidly have the effect of slowing-down, in the developing countries, the realization of projects in hand and of causing the cancellation of new projects. In this way one returns to the logic of a scenario of the low growth type.

Table 31. Variants of the low growth scenario

I. Rate of growth of the demand = 9%	1990 Demand	1990 Production				Balance			
		80-85% (1)	80% (2)	75% (3)	65% (4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	11.17	3.61	3.61	3.40	2.90	-7.56	-7.56	-7.77	-8.27
North Africa and Middle East	47.66	12.35	12.35	11.60	10.00	-35.31	-35.31	-36.06	-37.66
Latin America	87.70	53.65	50.50	47.30	41.00	-33.05	-36.20	-39.40	-45.70
Asia	93.28	47.94	45.12	42.30	36.70	-45.34	-48.16	-50.98	-56.58
TOTAL	238.81	117.55	111.58	104.60	90.60	-121.26	-127.23	-134.21	-148.21

II. Rate of growth of the demand = 6.5%	1990 Demand	1990 Production				Balance			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	8.66	3.61	3.61	3.40	2.90	-5.05	-5.05	-5.26	-5.76
North Africa and Middle East	36.92	12.35	12.35	11.60	10.00	-24.57	-24.57	-25.32	-26.92
Latin America	67.17	53.65	50.50	47.30	41.00	-13.52	-16.67	-19.87	-26.17
Asia	72.27	47.94	45.12	42.30	36.70	-24.33	-27.15	-29.97	-35.57
TOTAL	185.02	117.55	111.58	104.60	90.60	-67.47	-73.44	-80.42	-94.42

Table 32. Variants of the normative scenario

I. Rate of growth of the demand = 4%	1990 Demand	1990 production				Balance			
		80-85% (1)	80% (2)	75% (3)	65% (4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	6.67	8.37	8.37	7.85	6.80	+1.70	+1.70	+1.18	+0.13
North Africa and Middle East	28.43	20.04	20.04	18.79	16.28	-8.39	-8.39	-9.64	-12.15
Latin America	51.73	69.61	65.52	61.42	53.23	+17.88	+13.79	+9.69	+1.50
Asia	55.65	64.18	60.40	56.63	49.08	+8.53	+4.75	+0.98	-6.57
TOTAL	142.48	162.20	154.33	144.69	125.39	+19.72	+11.85	+2.21	-17.09

II. Rate of growth of the demand = 3.5%	1990 Demand	1990 production				Balance			
		(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Africa South of the Sahara	6.32	8.37	8.37	7.85	6.80	+2.05	+2.05	+1.53	+0.48
North Africa and Middle East	26.96	20.04	20.04	18.79	16.28	-6.92	-6.92	-8.17	-10.68
Latin America	49.05	69.61	65.52	61.42	53.23	+20.56	+16.47	+12.37	+4.18
Asia	52.78	64.18	60.40	56.63	49.08	+11.40	+7.62	+3.85	-3.70
TOTAL	135.12	162.20	154.33	144.69	125.39	+27.09	+19.22	+9.58	-9.72

D. THE PROBABLE SCENARIOS

54. Amongst the many variants listed above for each of the two major scenarios some are more probable than others. It is these 1990 images which it is necessary to identify amongst the possible futures.

55. Within the framework of the low growth scenario, the most probable results will be obtained as a function of the following elements:

a) This scenario is constructed under the constraint of a low level of growth of the demand. Over a long period it is not very probable, however, that the rate of growth of the demand will fall below the rate of population growth and this will lead - excluding a generalized crisis - to giving priority to a hypothesis of a growth of demand of 4%, slightly higher than this level.

b) It is known, from experience, that a low rate of growth of the demand is reflected in a slowing-down in the realization of projects in hand, and the cancellation of projects which have been the subject of preliminary studies, together with a weakening of the levels of operation of the plants. As a consequence the weakness of the growth of the demand encourages us to retain a hypothesis of an operating level of 65%, giving the following results:

Table 33

(in millions of tonnes)

	1990 Demand	1990 production (65%)	Balance
Africa South of the Sahara	6.67	2.9	-3.77
North Africa and Middle East	28.43	10.0	-18.43
Latin America	51.73	41.0	-10.73
Asia	55.65	36.7	-18.95
TOTAL	142.48	90.6	-51.88

c) It is known, however, that in this scenario projects of more than 1 million tonnes will have a decisive weight: 25 projects out of 75 account for 71.3% of the new capacities installed, and these projects involve mainly extensions of activity in countries already having extensive iron and steel experience in Latin America and Asia. This is why a differentiated level of operation will finally be retained, according to the region:

75% for Latin America and Asia, with their long experience,

and 65% for Africa and the Middle East.

This gives the following results:

Table 34.

(in millions of tonnes)

	1990 demand	1990 production (75-65%)	Balance
Africa South of the Sahara	6.67	2.90	-3.77
North Africa and Middle East	28.43	10.00	-18.43
Latin America	51.73	47.30	-4.43
Asia	55.65	42.30	-13.35
TOTAL	142.48	102.50	-39.98 (rounded to 40.00)

Under this most likely hypothesis the overall deficit of the developing countries would rise to 40 million tonnes, an increase of about 50% on the 1979 figure.

56. Within the framework of the normative scenario the most probable results would be obtained by taking into account the following factors:

a) The level of utilisation of the production capacities is a decisive variable. It is known, in fact, that the excess production obtained in 1990 with an operating level of 85-80%, as compared with the

production obtained with an operating level of 65%, represents by itself more than 60% of the steel production in the developing countries in 1980. The significance of a normative scenario is to incorporate a high level of political desire to construct, and it will as a consequence tend towards a high level of operation of the production capacities. It is nevertheless advisable to analyse the difficulties of construction and to distinguish between unfavourable and favourable factors.

The unfavourable factors are: the lack of experience of the new entrants and the predominance of major projects which imply complex management; more than 70% of the new capacity which is projected involves production units of more than 1 million tonnes. The inexperience of the new entrants is certainly a problem, but low rates of operation which are prejudicial to the profitability of the project will not, however, have anything more than a slight influence on the overall balance. By contrast experience has shown the difficulty of controlling large-sized plants.

There are, certainly, brilliant successes which are the exception, but it seems that the rise to full production at a satisfactory rate generally meets problems; amongst other reasons these include links with the local infrastructure and supplies and the inadequacy of training having regard to the complexity of the installations to be managed. Analysis shows that problems of interconnection between the parts of the plant, of the supply of cast iron to the steelmaking section, from the steelmaking section to continuous casting, etc., are major obstacles to the efficient operation of iron and steel plants.

Unfortunately any radical change in the design of plants is unlikely before 1990. But this would not be the position in the longer term where the improved design of iron and steel plants would facilitate access to industrial mastery, and this could constitute the dominant factor in a normative scenario for the iron and steel industry in the year 2000.

Meanwhile, and up to 1990, it is necessary to adapt as efficiently as possible to technological transfers which will be essentially mimetic where the design of companies is concerned.

The favourable factors are the experience acquired by an increasing number of the developing countries, the use of the direct reduction route, and a reduction in the size of units.

It has been seen that, despite their interest, micro- and mini-projects have only had a small overall incidence. By contrast the same can not be said of direct reduction. It will be recalled that 40 projects, representing about 40% of the capacity of the projects studied, involve this process. The size of these projects has tended to increase. Management of the direct reduction/electric furnace (or scrap/electric furnace) route seems however to be less complex than that of the high capacity blast furnace oxygen/oxygen converter/continuous casting route, where synchronization of the operations must be perfect at liquid metal level, and particularly at the converter-continuous casting interface.

The direct reduction route, furthermore, involves lower investment, and this attenuates the pressure of financial constraints.

b) To establish a balance between these favourable and unfavourable factors is not easy. It should be noted that the operating levels of the iron and steel industries in the developing countries have evolved as follows:

Table 35. Evolution of operating levels

	Developing countries	Developed countries
1974	69.4	89.5
1975	69.6	72.0
1976	72.7	74.6
1977	73.9	68.9
1978	76.5	72.3
1979	79.6	75.4
1980	80.1	69.5
1981	69.3	68.5

Source: World Steel Dynamics Paine-Webber
The Steel Strategist Mitchell Hutchins, Inc.
February, 1982

These averages hide considerable divergencies operating against Africa and the Middle East and operating in favour of Asia and, particularly, Latin America.

The most probable development would be a rate of 65% in North Africa, the Middle East and in Africa South of the Sahara, the result of the assimilation of major new capacities; a rate of 75% in Asia, where the production capacities would double, and 80% in Latin America where the production capacities would be multiplied by 2.3. Experience shows, in fact, that extension of the capacities is capable of exercising a negative impact on the utilization of the installed capacities when the changeover is not totally mastered, and this leads to envisaging a slight reduction in the utilization of production capacities, despite the increasing pressure of the demand.

Furthermore the existing evolution of the economic cycle inclines one to consider, as more probable, a rate of increase of the demand of 6.5% rather than 9%, although this latter rate was exceeded in the recent past.

c) Under these conditions the most probable corrected balance sheet would be the following:

Table 36

	Demand 6.5%	Production	Balance
Africa South of the Sahara	8.66	6.80 (65%)	-1.86
North Africa and Middle East	36.92	24.00 (65%)	-12.92
Latin America	67.17	53.73 (80%)	-13.44
Asia	72.27	54.20 (75%)	-18.07
	185.02	138.73 (72.5%)	-46.29

Under this combination of hypotheses the 1990 deficit in the developing countries would be multiplied by 1.7 and, taking into account a minimum of exports (for example 7 million), the minimum volume of the necessary imports would be of the order of 53 million tonnes as against 35 million tonnes at the present time. This scenario, although "normative" from the point of view of the production capacities, reflects a mediocre economic situation in regard to the utilization of the production

apparatus. The massive increase in imports of iron and steel products would aggravate the problems of the trading balance of the developing countries and, as a result, would complicate finding financing for their projects. It would therefore be necessary to correct the path so as to open up other perspectives.

d) It would be necessary to tend towards obtaining an operating level of 80% in Africa South of the Sahara and in North Africa and the Middle East, and of 85% in Latin America and Asia.

Under the hypothesis considered as being the most probable, that is a rate of increase in the demand of 6.5%, this approximates to the corresponding variant of the normative scenario (see Table 29), the results of which are repeated below:

Table 37

	Demand 6.5%	Production		Balance
Africa South of the Sahara	8.66	8.37	(80%)	-0.29
North Africa and Middle East	36.92	20.04	(80%)	-16.88
Latin America	67.17	69.61	(85%)	+2.49
Asia	72.27	64.18	(85%)	-8.09
TOTAL	185.02	162.20	(84%)	-22.82

In this way the deficit in supplies to the developing countries would be reduced by about 4 million tonnes as compared with the present situation. This 1990 estimate may be supplemented by an additional hypothesis. It is known that certain investment projects are explicitly directed towards exporting (see Dossier 1, para. 21). These involve, in particular, the projects for the production of sponge iron by direct reduction, representing a production capacity of 6.4 million tonnes. Assuming that the effective production would be 5 million tonnes and if this is added to the 7 million tonnes exported at the present time by the developing countries, would mean that the imports necessary to cover the net deficit would be about 35 million tonnes, and would hence be equivalent to existing imports.

57. The most probable variants of the low growth scenario and the 1990 normative scenario would therefore be the following:

Table 38.

	Low growth scenario (Hypotheses 4% and level of operation 75-65%)	Normative scenario (Hypotheses 6.5% and level of operation 85-80%)
Demand	142.5	185.0
Production	102.5	162.0
Balance	-40.0	-23.0

58. These variants of the scenarios, constructed with reference to the developing countries, need to be located in relation to the world production capacities which are likely to evolve as follows:

Table 39. Evolution of the world production capacities

(in millions of tonnes)

1980	Developing countries	76
	People's Republic of China and Democratic People's Republic of Korea	50
		126
	Developed countries	775
	World	900

(continued)

Table 39 (continued)

1990	Low growth scenario	
	Developing countries	140
	China and D.P.R. of Korea	60
		200
	Developed countries	800
	World	1,000
	Normative scenario	
	Developing countries	190
	China and D.P.R. of Korea	70
		260
	Developed countries	850
	World	1,100

It is not possible at the present time, in the absence of sufficient information, to explore, using the same method, the possible futures in the People's Republic of China and the Democratic People's Republic of Korea and in the developed countries. As the sample of countries becomes larger so the configuration of the future becomes more uncertain. Nevertheless a first estimation has been attempted which is based, in particular, on the analysis of the present situation and of trends in it[43]. It has been considered, in particular and on the basis of information available for the United States, the European Economic Community, the centrally planned economy European countries and Japan, that iron and steel investments relate less to extensions of capacity than to the intensification of iron and steel production, the improvement of productivity and the raising of the quality of the production.

59. Parallel to this the production would be likely to evolve as follows:

Table 40

			% of the world production
1980	Developing countries	58	8.1%
	China and D.P.R. of Korea	42	5.8%
		100	13.9%
	Developed countries	617	86.1%
	World	717	100
1990	Low growth scenario		
	Developing countries	102	12.5%
	China and D.P.R. of Korea	50	6.25%
		152	18.75%
	(rounded to	150)	
	Developed countries	650	81.25%
	World	800	100
	Normative scenario		
	Developing countries	160	17.1%
	China and D.P.R. of Korea	55	5.9%
		215	23.0%
	Developed countries	720	77.0%
	World	930	100

On the basis of these calculations production would increase by about 80 million tonnes between 1980 and 1990 under the scenario of low growth. Of this increase, about 40 million tonnes would be from the developing countries, about 10 from China and the Democratic People's Republic of Korea, and about 30 from the developed countries. The contribution of the developing countries would rise from 8.1% of the world production in 1980 to 12.5% in 1990 or, including China and the Democratic People's Republic of Korea, from 13.9% to 18.75%.

Under the normative scenario production would increase by slightly less than 220 million tonnes, about 100 million tonnes of which would be from the

developing countries, about 10 from China and the Democratic People's Republic of Korea, and about 100 million tonnes from the developed countries. The contribution of the developing countries would increase to 17.1% in 1990 or to 23% with China and the Democratic People's Republic of Korea included.

Despite the substantial changes reflected in these results it will be seen that the scenarios are very far from those projections which fix the production of the developing countries by the year 2000 at 378 million tonnes (lower hypothesis) or 481 million tonnes (upper hypothesis).(44) Such levels of production would imply, on the basis of an operating level of 85%, production capacities of the order of 450 to 460 million tonnes; that is to say it would be necessary to double, in the ten years from 1990 to 2000, the production capacities which are installed in 1990. This is another story which will depend largely on the course which the development of the iron and steel industry follows during the period 1980-1990.

60. Over and above these uncertainties <u>two underlying trends</u> seem to be confirmed as probable if not certain.

a) Whilst the current restructuring of the iron and steel industries in the developed countries is concerned less with the extension of capacities than with intensive modernization and improvement of quality, the needs of the developing countries constitute the dynamic factor in the growth of the world iron and steel industry. To hold back this dynamism would result in the industrial stagnation of the developing countries and, as a consequence, would aggravate the slowing-down in the activity of the developed countries.

b) The most probable variants of the two scenarios show, including in the normative scenario, an overall deficit in iron and steel products for the developing countries. Realization of the normative scenario does not, therefore, present a risk for equilibrium in the long term where world iron and steel trading is concerned; on the contrary it favours industrial activity and employment in the developed countries. The normative scenario implies, in effect, the implementation of intensified South-South, South-North, South-South-North relationships - "North" obviously including here both the "East" and the "West" - which it is necessary to list and explain.

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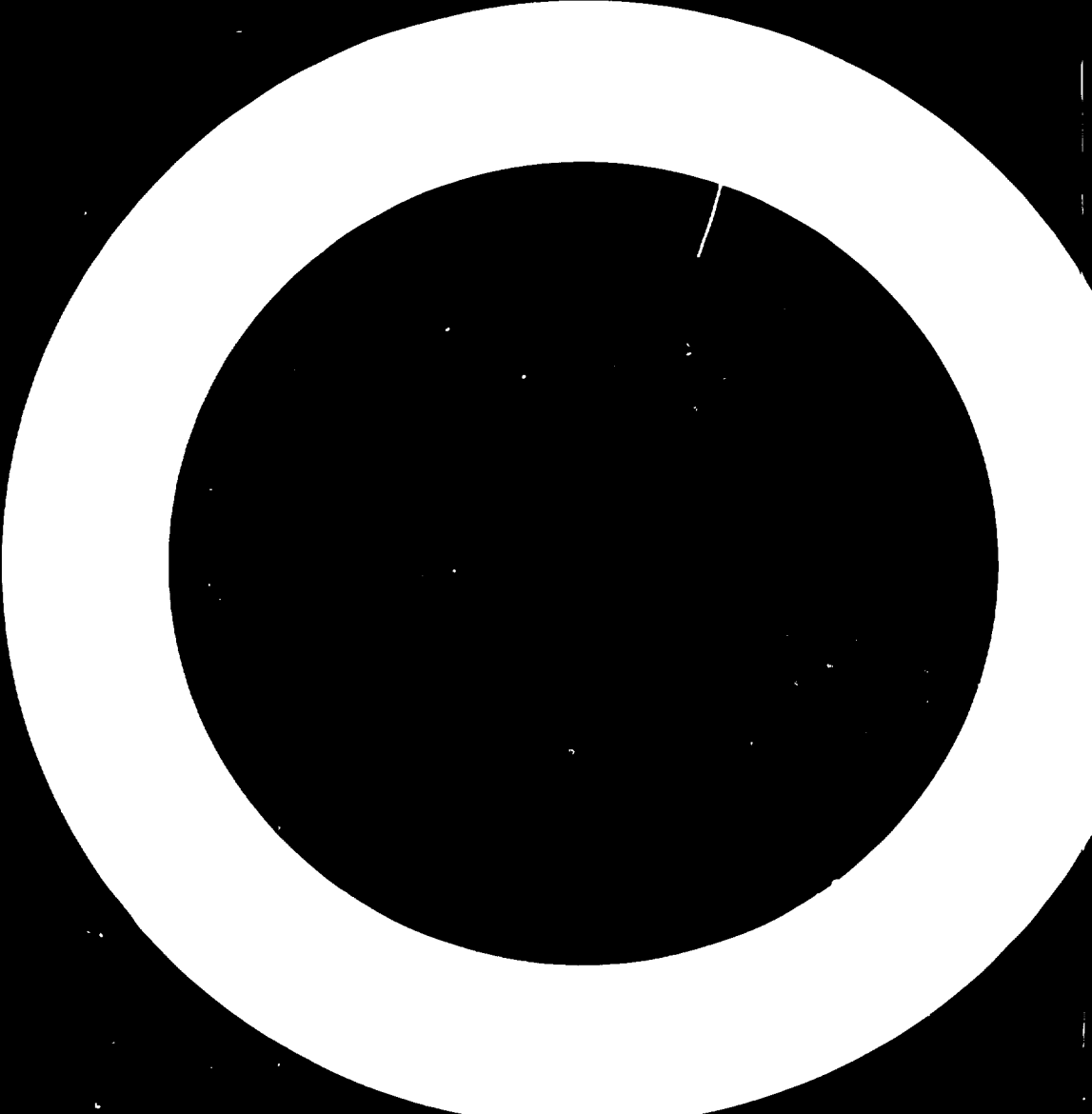


NEGOTIATING THE FUTURE

It is clear that the normative scenario constitutes the objective to be implemented during the decade by way of vigorous actions within the framework of reinforced and enlarged international cooperation.

Financing the iron and steel development of the "South": a resultant of international cooperation

61. The total cost of the iron and steel investments in the developing countries has been estimated at more than US$ 170 billion.

Analysis of "Dossier I" shows that 63.5 million tonnes of new capacities are now in course of realization or on the way to immediate realization (phase III projects). As a consequence slightly more than half the new production capacities envisaged are essentially "outside negotiation" for the future, the object of residual negotiation sometimes being additional financing. Such additional financing has been estimated at US$ 30b out of the US$ 98b necessary.

Still remaining to be financed is the other part, estimated at US$ 74b, plus the probable remainder of the first tranch, or a total of about US$ 100 billion.

62. The negotiations which are to be undertaken or concluded concern:

. "major projects", representing more than 35 million tonnes of productive capacity in the following countries: Argentina, Brazil, Chile, Colombia, Cuba, India, Mexico, Nigeria, other Asian countries, Philippines, Republic of Korea, Syrian Arab Republic, Thailand and Venezuela;

. direct reduction projects representing 6.7 million tonnes in the following countries: Argentina, Bahrain, Bangladesh, Brazil, Egypt, Ecuador, India, Iraq, Liberia, Oman, Pakistan, Qatar and the United Arab Emirates (Abu Dhabi);

. mini-iron and steel projects (up to 0.2 million tonnes) representing about 3 million tonnes in the following countries: Angola,

Bahrain, Bangladesh, Burma, Bolivia, Central African Republic, Democratic People's Republic of Yemen, Gabon, Ghana, Honduras, Indonesia, Jordan Liberia, Madagascar, Malawi, Morocco, Mauritius, Mozambique, Nicaragua, Oman, Peru, People's Republic of the Congo, Syrian Arab Republic, Uganda, United Republic of Tanzania, Senegal, Togo, Zaire and Zambia.

To these should be added the negotiations relating to projects for a production capacity intermediate between 0.2 and 1 million tonnes which represent about 14 million tonnes. These concern the following countries: Argentina, Brazil, Chile, Colombia, Ethiopia, Ghana, Jordan, Kenya, Liberia, Malaysia, Mexico, other Asian countries, Peru, Philippines, Republic of Korea, Singapore, Tanzania and Viet-Nam.

63. These countries find themselves in various situations from the point of view of their indebtedness, the nature of the latter - whether public or private financing -, their economic potentialities, the growth of their GDP and their exports, their capacity for domestic savings, and also the degree of solvency and risks which they present for banking institutions.(45)

64. The developed countries also find themselves in situations which are differentiated according to their general economic and financial situation and that of their iron and steel sector in particular. Most of them are facing problems of the restructuring of their industry, and this restructuring has a high cost. It is probable that the search for financing will be carried out under new conditions as compared with recent years. American, Japanese and European investments in iron and steel risk coming into competition, on the financial market, with projects in the developing countries.(46) It is probable that the former will be regarded by financiers as representing fewer risks than the latter.

65. The situation is therefore objectively difficult. However from another side the economic recession - or crisis - creates a situation which, paradoxically, gives rise to favourable factors. For example the producers of equipment are inclined to grant larger suppliers' or buyers' credits. The iron and steel companies may therefore be encouraged to compensate for declining profits and hazardous exports by the sale of technology and technical assistance.

66. Furthermore the problems of financing must be considered not as a homogeneous whole but as a function of the structure of the projects. Projects of small or medium size do not appear to pose, a priori, the same difficulties as the financial support for larger projects. It is true that the countries where small projects are dominant are also those where the degree of indebtedness is, in general, highest and which, from the point of view of the investor or organization making the loans, offer least guarantees. Indebtedness is, in addition, more of the public than private type. Under these conditions the financing of projects, if it cannot be covered within the terms of normal relationships between commercial partners, must be handled at State level. The framework of the negotiation changes its nature and becomes more a philosophy of "negotiated solidarity".(47).

In the case of the medium-sized direct reduction projects the question is one of knowing to what extent and under what conditions the industrial partners, and in particular the companies which own the processes, are ready to accept the financing of these projects.

In regard to the major projects, experience shows that the financial part results from the construction of the project itself and that negotiable elements, inside and outside the iron and steel activity, are numerous. Obviously the developing countries have variable advantages, factors of force or of weakness according to the case.

The large international banks, such as the World Bank, can play a catalysing role in mounting these financial operations. What counts less is the importance of their actual support than the guarantees which they provide. But what rank of priority is the iron and steel industry now relegated to? Has its "brand image" not suffered a deterioration with it now being considered as an irremediably declining industry(48) which it would be stupid to import into the developing countries ?(49) Whilst it is true that the per capita steel stock intensity tends to be stabilizing or diminishing in the developed countries it is, on the contrary, tending to increase in the developing countries. Furthermore

an analysis of technological trends shows that it is superficial to speak of a technological decline in the iron and steel industry.(50) The public relations of the industry, taken overall, need to be improved.

67. Examination of the problems of financing, as set out in Discussion Document No. 2, does not therefore lead to the conclusion, from simply considering the invoices for the projected investments, that there is an impasse. Possibilities exist which need to be examined during the Third Consultation.

Beyond financing: broader perspectives for international cooperation

68. The international cooperation to be put into effect will, in effect, be determinant for:

- training the skilled and highly skilled labour which is the basis of a modern iron and steel industry,
- supporting the rapid rise to full production by means of effective technical assistance.

According to the initial calculations implementation of the normative scenario assumes the training of about 775,000 additional persons, divided up as follows:

23,000 engineers and executives
132,000 foremen, technicians and staff
527,000 skilled workers
93,000 unskilled workers

A number of more advanced developing countries already have, or are acquiring, the capacities for training part or all of the industrial force which they need to expand their iron and steel production. Realization of the normative scenario implies, however, considerable participation by the developed countries in such a training enterprise in the form of:

- assuming responsibility for trainees in their steelworks and training centres,
- participation in on-site training by sending specialized training staff,
- participation in the creation of specialized training centres at various levels.

69. It must not be forgotten, in this respect, that the iron and steel industry will, in the period 1980-1990, become a highly skilled industry, where specialized training grafted onto a generally high level of education makes all the difference. The workers in the most advanced iron and steel industries are today recruited at matriculation level and are given a minimum training of several months before taking up their posts.

70. Training activities of the extent which are envisaged assume, firstly, that teaching methods are developed which are not a simple copy of the traditional methods already in use in the older industrialized countries. Secondly they assume that specific financing will be provided so as to accept, to a substantial extent, the additional costs which will arise.

71. It is also known that it is essential for full production to be achieved with the least delay. This imperative is still more pressing at a period when interest rates are reaching ceiling values and where any delay in coming into full operation loads the financial charges to a considerable extent. Effective technical assistance is one of the major components in the realization of a normative scenario. One must not underestimate the importance of the resources to be mobilized on the hypotheses that the needs for technical assistance personnel could reach about 10% of the executive personnel to be trained and 5% of the skilled workers to be trained. This would represent about 45,000 persons to be sent out during the period to the new iron and steel industries in the developing countries for short, medium or long duration periods, and whose stay will need to be suitably integrated with the national system so as to ensure their maximum utilization. Training and technical assistance are likely to become the fields of privileged activity for the

iron and steel companies in the advanced countries. One must not omit from this perspective the possibilities offered by the availability of executives and technicians in those iron and steel industries which are now being restructured, and who are faced with early retirement or with unemployment. In most of these countries national schemes have been instituted which ensure financial compensation for those who lose their jobs. Why not translate, to greater mutual benefit, these actions into the form of active international cooperation, in particular to the profit of new entrants into the iron and steel industry ? The iron and steel countries of the developed countries, in liaison with their governments, need to integrate these still vital forces into activities for technical assistance and training which it is in their interests to promote.

72. In the longer term, up to the year 2000, it is not utopian to believe that the design and organization of new iron and steel units could be undertaken as a function of possible training progressions for the new working teams called on to master the new iron and steel installations. This reversal of perspectives, to design and manage industrial units as a function of men, does not concern the developing countries alone. Increasing social demands in the developed countries are also moving in this direction. It is not too early to consider these questions, even if their solution belongs to problems of the scenarios for the year 2000.

Reciprocal interests impart a new dimension to international cooperation

73. The international cooperation necessary for the implementation of the normative scenario is not just in one direction. It certainly implies active and massive participation by the developed countries; it is also necessary to emphasize that it is beneficial not only to the developing countries but also to the developed countries. Technical assistance and training offer firstly a new opportunity for valorizing the intangible potentials of knowledge and know-how. Secondly the realization of iron and steel projects in the developing

countries creates jobs in the industries of the developed countries. It is necessary to accept the fact that the fears of workers in the iron and steel industry in certain developed countries of losing their jobs are legitimate. It is also necessary to recognize that exports from some developing countries have only played a marginal role in the difficulties encountered, and that the configuration of the normative scenario is of a type to dissipate those fears which could arise as a result of the development of an exporting iron and steel industry in the developing countries. Projects in the developing countries are to a very considerable extent intended for meeting their domestic needs, and implementation of the normative scenario should be reflected by the maintenance of a deficit of more than 20 million tonnes, that is to say a flow of imports of iron and steel products which would exceed 30 million tonnes per year.

By contrast the incidence of supplying part of the equipment necessary for constructing the iron and steel industries in the developing countries on work in the industry of the developed countries should not be underestimated. It has been estimated, in fact, (see Dossier VI) that the gross gain in employment in the developed countries would rise, in the case of the normative scenario, by more than 1,200,000 man-years, very weakly compensated by the failure to achieve profits resulting from the export of iron and steel products from the developing countries within the framework, for example, of "buy-back" agreements. It has been possible to calculate that the ratio between gains and losses in employment for the developed countries would be 4 to 1.

It is true that the workers concerned belong to other branches of activity if the iron and steel companies are not themselves the producers of the equipment.

Clarification of these questions is therefore of considerable importance if one considers the force of social pressure which is exercised by the representatives of the depressed sectors on decision-making centres in certain developed countries, whose financial and technical assistance is recognized as being indispensable to the realization of iron and steel projects in the developing countries.

74. Cooperation between the developed countries and the developing countries, which is essential to the realization of the normative scenario, rests therefore on solid bases, inasfar as their interests are reciprocal. Cooperation between "North" and "South" is not, however, exclusive of cooperation between the "South" and the "South".

The potential for "South-South" cooperation

75. The question which has been asked several times during recent years is whether, in default of the hoped-for cooperation from the developed countries, "South-South" cooperation would be able to offer a replacement solution.

This question has been the subject of an analysis in the preparatory work of the Secretariat.(51) Amongst the seven scenarios envisaged two were based on "South-South cooperation", the one generalized, the other limited. It is true that the dynamic of regional integrations may oscillate between the poles of cooperation and conflict with the "North" and, according to differentiations, between the "West" and the "East". In this way the industrialization policy adopted by the African Heads of State at Lagos(52) constitutes a reaction to the stalemate - or what is considered as such - of the major international conferences. The move towards self-reliance and, in certain cases self-sufficiency, is a measure of their disenchantment in regard to the development of international relationships, together with a desire to rely on their own resources rather than on those of others. However, slowly, positive forms of "South-South" cooperation are now appearing and are being confirmed, for example through the Caracas programme(53).

76. Even if a scenario of regional self-reliance seems to be difficult to realize for the construction of the iron and steel industry, by contrast substantial possibilities of cooperation exist, as is shown by an examination of the situation in each of the major regions of the world.

. In Africa South of the Sahara: it is in this zone that a scenario of self-reliance seems to be the most difficult to realize.

Certainly iron ore and hydrocarbons are available in Guinea, Liberia, Mauritania, Nigeria, etc.

On the other hand the region has no coking coal and very little sponge iron to supply the electric furnaces as a replacement for scrap; furthermore it does not have major sources of financing.

As far as equipment, engineering and industrial mastery is concerned it is clear that the region can not supply itself.

It is possible to imagine, if the financial constraint is to be lifted, that there should be cooperation with the countries of North Africa, such as Algeria or the Libyan Arab Jamahiriya, and with the Arab Bank for Development or with the Islamic Bank. It is a question of negotiating financing against the supply of iron ore, or even of iron ore against sponge iron. By contrast North Africa and the Middle East have very limited capacities for engineering or the construction of capital equipment goods, and this would therefore necessitate calling on third party cooperation (for example from India).

. In North Africa and the Middle East the conditions are more favourable, provided that inter-continental cooperation can be achieved between the developing countries.

Financing seems to be assured. Hydrocarbons and natural gas permit the use of direct reduction. However some factors are lacking: there is little or no iron ore, in particular of the grade needed for direct reduction; no coking coal, whilst the problem of water is also a limiting one.

These difficulties could be surmounted by calling on African iron ore from south of the Sahara, or by using Brazilian or Indian ore.

Engineering (the first bases of which exist in Algeria and Egypt) is undoubtedly the most limiting factor, together with the supply of capital equipment goods. Collaboration with Brazil and India could give consistency to such a scenario.

. In Latin America regional self-reliance would be largely realizable, provided the problems of financing can be lifted.

Iron ore does not pose any problem, either in quantity or in quality. Brazil is a major producer, as are also Chile, Peru and Venezuela which are exporters, whilst Bolivia, Colombia and Mexico are also producers.

Only Colombia possesses major reserves of coking coal, still little worked; Brazil, Chile, Mexico and Peru also have coal, but this is generally of a mediocre quality. By contrast Argentina, Bolivia, Colombia, Ecuador, Mexico, Trinidad and Tobago and Venezuela have hydrocarbons and, in particular, natural gas.

Brazil possesses immense forests, as do also Central America and the Argentine - which would make it possible to develop the production of cast iron using charcoal.

In regard to engineering and equipment Brazil is now able to manufacture 70 to 80% of the capital equipment necessary; by contrast its basic engineering capacities are far from being sufficient. Mexico is launching a very broad plan for mastering the design and production of equipment. Capacities exist in Argentina, and also in Chile and Venezuela. The HYL direct reduction process is of Mexican origin.

Definitively, therefore, the region seems to be able to provide, during the decade, an adequate design capacity to develop its experience of direct reduction, and to incorporate a major part of the capital equipment goods necessary for the installation of large-sized units.

The experience of the region goes back sufficiently far in time, and is sufficiently diversified, so that educational, technical and management training would make it possible to assimilate the new dimension of the Latin- American iron and steel industry under favourable conditions.

There remains the financing problem. Only Ecuador, Trinidad and Tobago and possibly Mexico seem to be in a position to achieve this; it is less certain in the case of Venezuela, and is certainly not the case for the other countries.

. In Asia a scenario of regional self-reliance encounters serious difficulties.

The region possesses both advantages and limiting factors. India, for example, has high grade iron ore which it exports, whereas other countries (Indonesia, Thailand) have only limited quantities.

Bangladesh, Pakistan and Thailand have natural gas, which Indonesia and Malaysia are preparing to export in large quantities.

In this way Indian iron ore and Indonesian or Malaysian natural gas might make it possible to envisage the partial supply from the mini-iron and steel works of the region of sponge iron, as an addition or replacement for scrap iron.

India is in the process of moving progressively towards self-sufficiency in equipment and engineering. It exports studies and projects (MECON, DASTUR Co.). However the equipment which it constructs is not sufficient for its domestic needs, and it seems unlikely that India will be able, between now and 1990, to change this situation radically. India has a long and rich experience in iron and steel training, and the region could profit from this.

The experience of the Republic of Korea is more recent but it is revealing in regard to the construction of works and the rate of achieving full production.

By contrast, and where financing is concerned, only Indonesia and Malaysia have, because of their oil resources, certain possibilities, but these do not seem to be sufficient for a process of regional self-financing for the iron and steel industry. However the banking centre of Singapore - the headquarters of the Asian Development Bank - plays an active intermediary role in this field.

The region is linked by complex linkages to the exterior; it is improbable that these will be considerably extended. These are links with the oil countries of the Middle East, with the Moslem countries, with Australia as a supplier of coking coal and iron ore, but particularly with Japan as a supplier of equipment, engineering, technical assistance and as organizer of the commercial networks.

77. The possibilities of "South-South" cooperation, differentiated according to the regions, are therefore entirely real; they hinge increasingly frequently around the possibilities of "North-South" cooperation inasfar as new forms of cooperation are tending to be developed of the "North-South-South" type (also termed triangular operations), which can be seen as being full of promise for the future.

Profitable iron and steel industries in the "South"

78. The normative scenario is designed to construct, in the developing countries, plants which operate and which are not condemned to be loss-making, since there are no factors weighing on iron and steel companies to condemn them to non-profitability. There are at the present time, throughout the world, companies which operate and which produce profits not only in the developed countries(54) but also in the developing countries(55).

Rising productivity - the sole source of the creation of an economic surplus - is the principal response to the exogenous factors which contribute to the deterioration of the financial situation of the iron and steel industry.

79. It is known that the influence of relative prices between inputs and outputs in the iron and steel industry generally produces a double-squeeze effect which operates to the detriment of the industry by provoking negative economic transfers.

Transfers of value and surplus are developing within the iron and steel industry with different significances. The rapid rise in the price of energy and capital equipment goods is reflected in negative transfers from upstream. These transfers can, however, become positive when the relative prices of the ores are depressed. Each time the relative prices of steel fall transfers are effected to the profit of downstream, that is to say the metal and engineering industries which use steel. It is remarkable that the iron and steel industry has so much difficulty in retaining, for its own benefit, and because of the competition which operates on the markets, the price supplements which are constantly being added by improvements in quality. It is, in general, the users who profit from these.

Realignment of relative prices would necessitate a series of internal and international corrections which are evidently more difficult under the conditions of a weakened demand.

Relative prices and unfavourable trading terms do not, however, constitute impossible obstacles in the growth of the sector. It has been seen that in certain countries (Austria, the United States and France), and at certain periods, branches of the economy with a high increase in productivity have generally been those where the trading terms were unfavourable; the growth of productivity appears as the answer to contrary economic conditions, the latter stimulating the former. The case of the Japanese iron and steel industry is evidence of this. However the same does not apply to those countries which do not have the capacities for answering the threat, and whose economic structure is too weak at the beginning to be able to confront excessively contrary conditions.

80. Whatever the position, it is a matter of taking care not to apply criteria of strict profitability, and not asking, for example, if an economic surplus is created and where this surplus is effectively accounted for, either at the level of the iron and steel activity itself or also upstream or, more frequently, downstream, at the users of the iron and steel production. Evaluation of iron and steel activity cannot be removed from its complex environment; it has often been said that the iron and steel industry is a motive economic activity. It is from this enlarged perspective that the results must be evaluated.

81. It follows from this that all the available capacities will be utilized so as to obtain the economic results up to the level of the total capital invested. It is impossible to over-emphasize, from this point of view, the value of successful commissioning and of a rapid rise to full production. It is known, in fact, that a 1,000,000 tonne plant for flat products costs about US$ 2 billion. If such a plant achieves its normal production capacity in five years then, between the fifth and fifteenth year the plant will produce 1 x 10 = 10 million tonnes which, at US$ 400 per tonne, are worth US$ 4 billion; if, on the other hand, the nominal capacity of this same plant is only achieved at the end of the tenth year the value of the production obtained between the fifth and fifteenth year would only represent US$ 2 billion. The failure to achieve profit will be so high

that it will tend to equal the value of the investment itself.

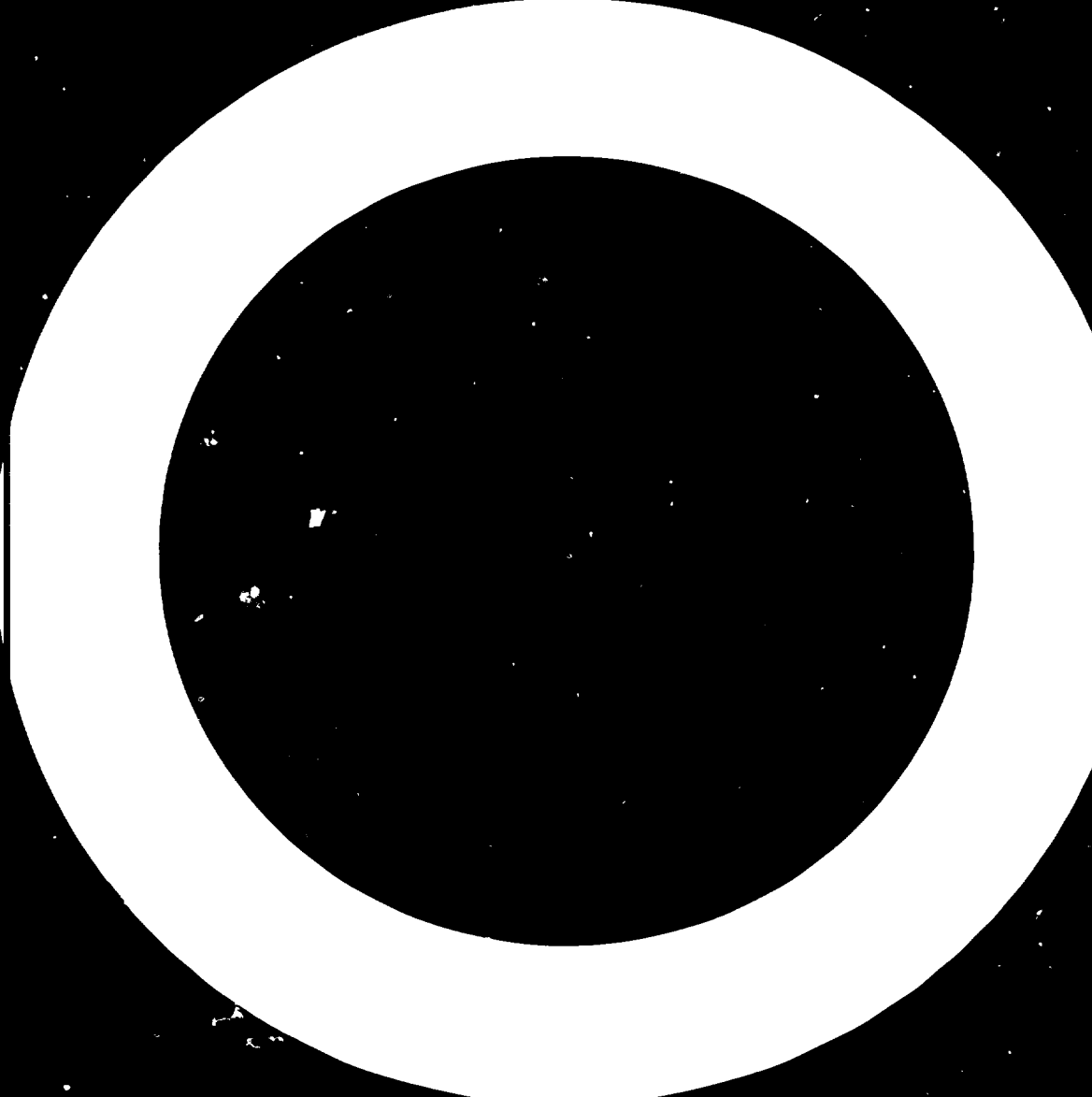
82. The normative scenario proposes to implement all those measures which would make it possible to limit these losses, and to unite together all the conditions for the creation of an enlarged surplus as a result of the cooperation of all the parties interested in this. This conditions the development of the developing countries, but is also the condition if all are to emerge from the crisis.

A horizon of the year 1990 has been fixed for the scenarios. We are already in 1982 and, after the Third Consultation, there will only be seven years in which to realize the normative scenario. Inasfar as this scenario is not a purely academic exercise or a mere hope, but an objective to be achieved, it is necessary to trace out the path and to identify the temporal constraints.

It will therefore be observed that, in order to enter into production in 1990 or, a fortiori, before 1990, the major projects (of 1 million tonnes and above) must be the subject of decisions in 1982-1983 or, at the latest, in 1985. It is therefore before 1985 that the projects listed in categories I (project concept and pre-feasibility study) and II (projects in course of study and negotiations) must be decided on; any delay would involve holding back the realization of the normative scenario, by the equivalent time lost, to beyond 1990.

The international community therefore has three to four years to implement active policies.

It is during this period that the necessary negotiations must be undertaken, and the framework of international cooperation which is essential to the success of the project must be strengthened.



N O T E S

Notes

(1) Report of the First Consultation Meeting on the Iron and Steel Industry - Vienna, 7-11 February 1977 - ID/WG.243/6/Rev.1, 1 March 1977

(2) Report of the Second Consultation Meeting on the Iron and Steel Industry - New Delhi, 15-19 January 1979 - ID/224, March 1979

(3) In order "to avoid any confusion from the outset of the principles, limitations and objectives of the scenarios" the Second Consultation recommended that "account should be taken of : (a) Policies of national authorities or regional and subregional groupings of developed countries (particularly as regards current or future restructuring of the sector) and of developing countries; (b) Bilateral relations; (c) The independence and dynamism of economic operators; (d) Liaison with governments and financial institutions to seek their support; (e) Allowing the operators concerned to pursue development needs for the iron and steel industry with greater dynamism and effectiveness; (f) Providing concrete indications for possible international co-operation in the iron and steel sector in the common interest; (g) Indicative references for possible developments of the iron and steel industry in the period up to 1990; (h) Development aspects of: infrastructure, manufacture of capital goods, provision of services, manpower needs, manpower training and management, maintenenance, health and safety, social needs and natural and financial resources."

(4) Documents submitted for examination by the Working Group :

First meeting of the small expert group
Vienna, 3-5 September 1980

- UNIDO/ICIS.161/Rev.1 "Picture for 1985 of the world iron and steel industry"
- UNIDO/ICIS.161/Rev.1/Add.1 "New elements for the preparation of the 1990 scenarios"
- Interim report on world-wide study on the iron and steel industry (contribution to the world iron and steel scenarios up to 1990), July 1980 - Dastur Engineering International GmbH
- Contribution to the world iron and steel 1990 scenarios, July 1980 - Voest-Alpine
- Aide-mémoire - The energy outlook with special reference to energy, cost and fuels, and materials - by A. Szpilewicz

Second meeting of the small expert group
Vienna, 12-13 March 1981

- UNIDO/ICIS.213 "1990 Scenarios for the iron and steel industry - Part one 'The dossiers'"
- UNIDO/ICIS.213/Add.1 "Scenarios for the iron and steel industry - Part two 'Proposals for the scenarios'"

Third meeting of the small expert group
Vienna, 3-4 December 1981

- ID/WG.356/1 "1990 Scenarios for the iron and steel industry - 'Special Dossier' - Complementary paper to Dossier III: 'Study of markets for the iron and steel sector created by the development and diversification of energy production'"
- ID/WG.356/2 "1990 Scenarios for the iron and steel industry - 'Special Dossier' - Complementary paper to Dossier III: 'Evolution of the structure of international trade from 1972 to 1977 by main categories of iron and steel products'"
- ID/WG.356/3 "Report on the progress made in drawing up the 1990 scenarios for the iron and steel industry"
- ID/WG.356/4 "1990 Scenarios for the iron and steel industry - 'Special dossier' - Complementry paper to Dossier VII: 'Iron and steel projects versus indebtedness, savings, exports and credit-worthiness'"
- Revised version of Part II of the "Scenarios" - paragraphs 114 to 139: 'Review of the situations resulting from the scenarios for the regions of the developing countries'
- Aide-mémoire "Selection of the negotiable items in the iron and steel industry. Ad-hoc meeting of the bureau of the small expert group and the UNIDO Secretariat - Vienna, 6-7 August 1981"
- "1990 Scenarios for the iron and steel industry - 'Special dossier' - Supplementary note to Dossier II: 'Prospects and problems of iron ore supplies'"
- UNIDO/IS.213/Rev.1 "1990 Scenarios for the iron and steel industry - Part one 'The dossiers'"
- Complement to Dossiers V and VI: "The difficulties in achieving full production in iron and steel plants in the developing countries"

Second meeting of the Working Group on the development scenarios for the iron and steel industry, Estoril (Portugal), 3-5 February 1982

- UNIDO/IS.213/Rev.2 "1990 Scenarios for the iron and steel industry - Part one 'The dossiers'"
- UNIDO/IS.213/Add.1/Rev.1 "1990 Scenarios for the iron and steel industry - Part two 'Proposals for the scenarios'"
- ID/WG.363/1 "1990 Scenarios for the iron and steel industry - 'Special dossier' - Supplementary note to Dossier III: 'Mini steel industry'"
- ID/WG.363/2 "The normative scenario - Effects and conditions of realization"
- ID/WG.363/3 "Crisis and trends in the restructuring of the iron and steel industry - Implications for the scenarios"
- Map of the geographical distribution of iron and steel projects in the developing countries
- Diagram of the interface of negotiations
- Diagram of the configuration of negotiations

Working group meeting on the long-term contracts for purchase/supply of iron and coking coal, Bratislava (Czechoslovakia), 16-18 March 1982

- ID/WG.360/1 "Iron ore, its supply, market structure and contractual arrangements"
- ID/WG.360/2 "Metallurgical coal in the 1980's - Facts and prospects"
- ID/WG.360/3 "Discussion paper"

(5) Michel Godet: "Crise de la prévision - Essor de la prospective" - PUF, 1977

(6) "The world iron and steel industry (Second study)" - UNIDO/ICIS.89 - 20 November 1978 - Original: French

(7) "Picture for 1985 of the world iron and steel industry" - UNIDO/ICIS.161/ Rev.1 - 16 July 1980 - Original: French

(8) Two global matrices for the iron and steel industry have been established, one by an Indian team, the other by a Soviet team.
Dastur Engineering International GmbH, Düsseldorf:
- "Report on world-wide study on the iron and steel industry (contribution to the world iron and steel scenarios up to 1990) - October 1980
- "Scenarios of developing the world iron and steel industry up to 1990" prepared by the group of Soviet experts - Moscow, April 1981

(9) "The dossiers" - UNIDO/IS.213 - 23 February 1981 - Original: French

(10) Third meeting of the small expert group - Vienna, 3-4 December 1981

(11) Second meeting of the Working Group - Estoril, 3-5 February 1982

(12) Report of the Second Consultation Meeting on the iron and steel industry (New Delhi (India), 15-19 January 1979) - see Recommendation 7.

(13) The 1982 analysis examines the developments since the second study on the iron and steel industry - UNIDO/ICIS.89 dated 20 November 1978

(14) Peter F. Marcus: "Steel imports" - March 2, 1982 - Ed. Paine Webber - Mitchell Hutchins Inc.

(15) Oil Country Tubular Goods - OCTG

(16) cf., for example, Crandall: "The US Steel industry in recurrent crisis - Policy options in a competitive world" - Ed. The Brookings Institute

(17) "Metal Bulletin" of 26 March 1982

(18) "Metal Bulletin" of 26 February 1982

(19) Instituto Mexicano de Investigaciones Siderurgicas - January, 1982

(20) cf. Nippon Steel News - October 1979

(21) Source: EEC

(22) Sh. Hosoki and T. Kono: "Japanese steel industry and its rate of development" - Paper to the Conference of the Metal Society - Amsterdam, 1979

(23) "Les besoins en énergie de la sidérurgie de l'an 2000" - Annales des Mines - November 1978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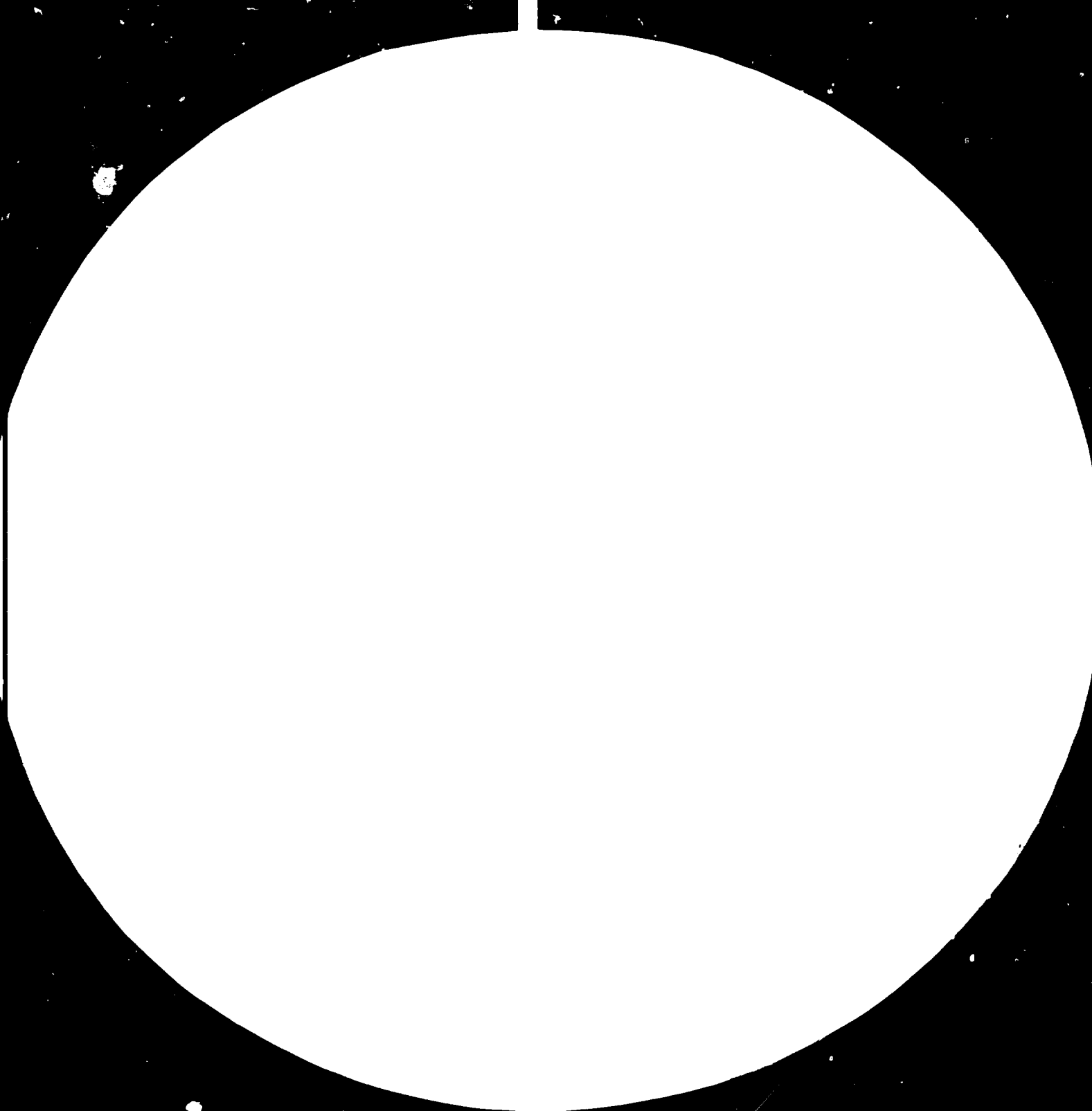
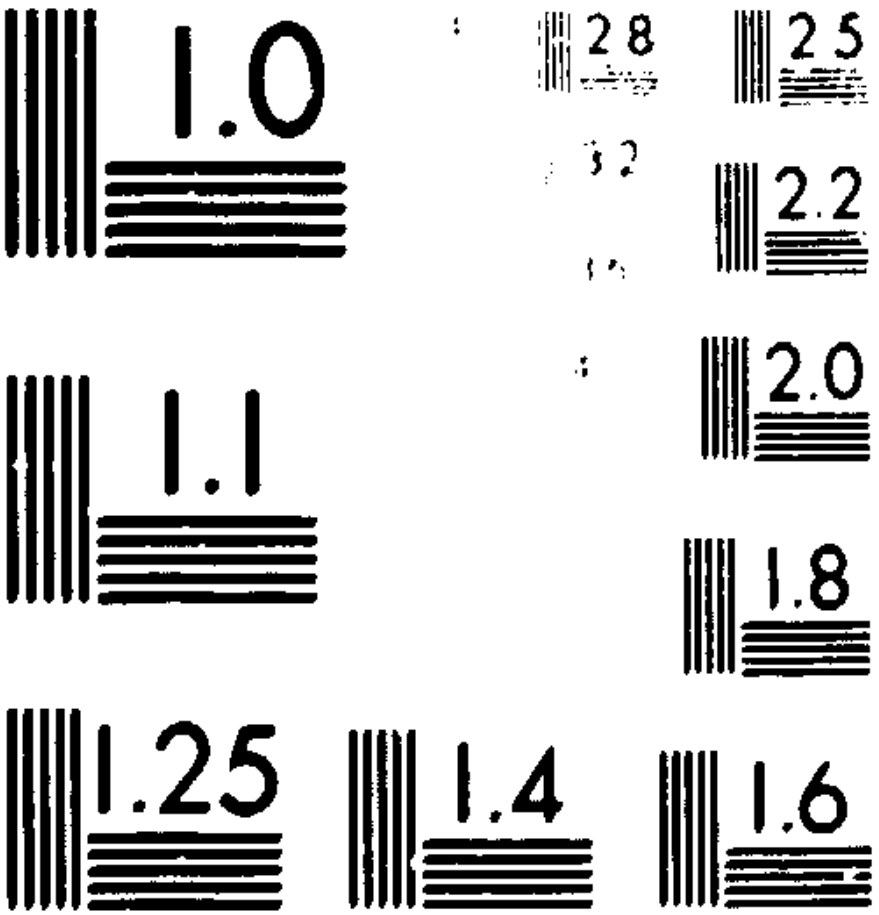




(24) Prof. V.A. Romenets, N.T. Perlov, L.V. Kovalenko, N.F. Sklokin, V.V. Shchepansky: Technological complexity of iron and steel industry products - Contribution to the world 1990 iron and steel scenarios - UNIDO - Moscow, May 1982

(25) Paper by K. Irvine "Developing steel for the market" to the Conference of the Metal Society - Amsterdam, 1979

(26) Bulletin of the City Bank - June 1980 - p.14

(27) American Petroleum Institute

(28) See reference (24)

(29) To the extent that it is not realistic to imagine that the developing countries will cut themselves off from the most advanced industrialized countries.

(30) Interfutures "Facing the futures" - OECD, 1979

(31) "The future of the world economy" (US Study), 1977

(32) UNIDO - "UNIDO world industry co-operation model" (Provisional document for the IFIP Conference on Global Modelling) - Dubrovnik, 1-5 September, 1980

(33) "The UNITAD project: a world model to explore institutional changes over the long run" - Industry and Development No.6 - UN, New York, 1981

(34) IIASA - "Study on scenarios for energy supply and demand" - 1981

(35) The World Bank - "World development report" - 1981

(36) Trade and development report - 1981 - TD/B/863/Rev.1

(37) Minor differences exist between the data in Dossier I concerning the breakdown between categories I and II on the one hand and category III on the other, with projects representing about 1 million tonnes now able to be considered as certain of being realized

(38) Point 2 of the "Conclusions and recommendations" - doc. cit.

(39) "Uses of the UNITAD model" - World Modelling Working Paper produced by the Global and Conceptual Studies Branch for the ACC Task Force on Long-term Development Objectives - Technical Working Group - 14-18 December 1981, New York - UNIDO/ICIS.305, 15 April 1982

(40) According to the paper cited above the IDS 1 scenario places the emphasis essentially on South-South cooperation. The IDS 2 scenario is, in a sense, more "conservative" but more "realistic". It postulates a reinforcement of "North-South" links. Nevertheless it has seemed to meet the realities of the iron and steel industries in the developing countries more effectively as a general framework. In fact during the preparatory work of the Secretariat, and out of the 7 iron and steel scenarios envisaged,

two were based on "South-South cooperation", one generalized and the other limited. The analysis showed that, with the exception of Latin America, those scenarios based on regional self-reliance were not very realistic.

(41) See in "The world iron and steel industry - Second study" - UNIDO - doc. cit.: "The problem of forecasting methods"

(42) According to a calculation made by the French Iron and Steel Trades Association and OTUA 77% of the final uses of steel in France related to investment and only 23% to consumption. The 1 million FF spent by French households resulted in 2 tonnes of steel being used, whereas 1 million FF spent on investment resulted in a mean usage of 21 tonnes. The demand for steel varies according to the nature of the investment: 10 tonnes of steel per million FF invested in the tertiary sector, 16 tonnes of steel per million FF invested in industry, 81 tonnes of steel per million FF invested in industrial constructional work. However it also varies according to the equipment and goods produced: 27 tonnes of steel per million FF in automobiles, 20 tonnes per million FF in household equipment, 163 tonnes per million FF in boilerwork, 152 tonnes per million FF for structural metalwork, 25 tonnes per million FF for machine-tools and 1 tonne per million FF in precision engineering. ("Possibilities for the development of steel consumption in France" - 21 December 1981)

(43) See also Chapter II : "The iron and steel industry in 1982: the situation and trends"

(44) "Draft world-wide study on the iron and steel industry 1975-2000" prepared for the First World Consultation - UNIDO/ICIS.25 - 15 December 1976

(45) See also Dossier VII "Costs and financing" the note : "Iron and steel projects versus indebtedness, savings, exports and credit-worthiness" - ID/WG.356/4, 26 November 1981

(46) See also Chapter II : "The iron and steel industry in 1982: the situation and trends"

(47) On negotiating solidarity see the papers from the International Institute for Labour Studies, I.L.O., Geneva

(48) Robert U. Ayres : "Uncertain future - Challenges for decision-makers" - John Wiley & Sons, 1979

(49) Jean-Jacques Servan-Schreiber

(50) See Dossier IV "Technology and research"

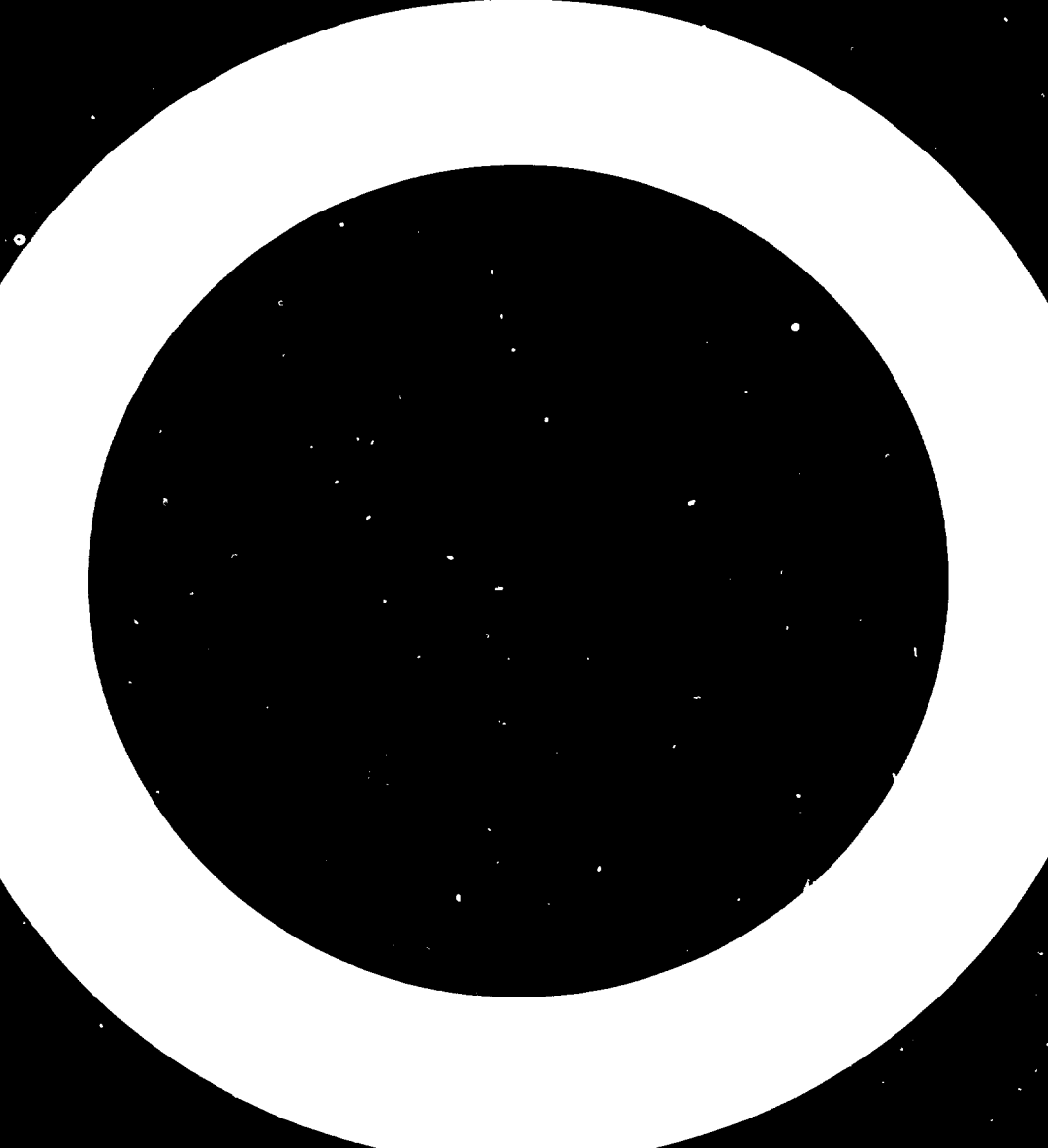
(51) See "Proposals for the scenarios" - UNIDO/IS.213/Add.1/Rev.1 - 15 December 1981

(52) Lagos Plan of Action for the implementation of the Monrovia Strategy for the economic development of Africa, 1980-2000 - OUA/ECM/ECO/ 9(xiv)/Rev.2

(53) See the Caracas Programme of Action, adopted by the High-Level Conference on economic cooperation among developing countries, held at Caracas from 13 to 19 May 1981 - United Nations - General Assembly - A/36/333, 26 June 1981

(54) See Dossier V : "The design and implementation of projects and the commissioning of new plants"

(55) See reference (54)



A N N E X

Scenario of low growth

Table 41 Category III projects in Africa, South of the Sahara

	in millions of tonnes
Cameroon	0.036
Ivory Coast	0.034
Nigeria :	
Adjaokuta	1.300
Delta Steel	1.300
3 units :	0.200
	0.200
	0.200
TOTAL	3.270

Table 42 Category III projects
in North Africa and the Middle East

	in millions of tonnes
Algeria :	
Jijel	2.000
Oran	0.050
Egypt :	
Dekkheila	0.815
Iran :	
Isfahan 2	1.400
Ahwaz	2.500
Libyan Arab Jamahiriya :	
Misurata	1.300
Morocco :	
Nador 1	0.450
Saudi Arabia :	
Jubail	0.850
Jeddah	0.100
Tunisia :	
Extension	0.225
TOTAL	9.690

Table 43 Category III projects in Latin America

		in millions of tonnes
Argentina	: Small units	0.250
	Zapla extension	0.200
	Sidersur	0.500
	Somisa	1.500
Brazil	: CSN extension	1.100
	Usiminas "	1.100
	Cosipa "	1.000
	Aconimas	2.000
	Tubarão	3.000
	Acesita	0.700
	Belgo-Mineira extension	0.300
	Mannesmann "	0.650
	Mendez Junior "	0.600
	Acopalinas	0.250
	Gerdau	0.400
	Siderbul	0.460
	Usiba	0.200
	Small projects	1.000
Colombia	: Paz del Rio	0.200
	Small units	0.250
	Ferroumiera	0.100
Cuba		0.300
Ecuador		0.430
Honduras		0.100
Mexico	: Ahmsa	0.750
	FMSA	0.370
	Sicartsa	3.000
	Tamsa	0.475
	Hylsa	1.500
	Tampico I	1.330
	Small units	0.250
Paraguay		0.100
Peru	: Laminadoras del Pacifico	0.150
Venezuela	: Sidor	3.600
TOTAL		28.120

Table 44 Category III projects in Asia

	in millions of tonnes
Burma	0.020
India :	
Bokaro extension	1.800
Bhilai "	2.200
Tisco "	1.000
Vizakaptnam I	1.600
Paradip	1.300
Vijayanagar	1.000
DR unit	0.140
Indonesia :	
Krakatau extension	1.500
Malaysia :	
Malayanata extension	0.250
Amalgamated "	0.230
Labuan	0.600
Rengaunu	0.600
Other countries of Asia :	
Small units	2.000
China Steel 2	1.725
Tang Eng.	.275
Pakistan :	
Pipri I	1.100
Philippines :	
Plate mill	0.130
Small units	0.175
Republic of Korea :	
Posco 5	1.100
New unit 1	3.000
Small units	1.000
Singapore :	
NISM extension	0.250
Thailand :	
Small units	0.150
Viet-Nam :	
Reconstruction	0.250
TOTAL	22.400