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29 April 1981

West Europe Report

(FOUO 23/81)

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CONTENTS

THEATER FORCES FRANCE

INTEGRATED GROUND AIR DEFENSE SYSTEM DESCRIBED

Paris AIR & COSMOS in French 21 Mar 81 pp 38-39

[Article by Jean de Galard: "Thomson-CSF's Air Defense MIDAS System"]

[Text] Thomson-CSF has developed a new phased-array antenna for the 2215-D version of its TRS 2215 electronic-scan radar system. The company chose to show this new antenna to the press before its first public exhibition at the next International Aeronautics and Space Show. At this press showing, key officials responsible for the broad range of air defense projects in Thomson-CSF's various divisions and subsidiaries discussed the different aspects of air defense and described their company's philosophy for tackling the problems to be solved in meeting each armed force's particular requirements. They also reviewed the specific characteristics and performance data of the air-defense equipment developed by Thomson-CSF.

Air Defense Systems

In dealing more specifically with the missions and organization of air defense systems and tactical operations control systems, Mr Rouviere strongly emphasized a major principle, namely that it is fundamentally erroneous to believe that the air defense problem is universal in character and has relatively standard solutions.

After having outlined the primary functions of an air defense system--intelligence, decision-making, operations control--and certain complementary functions--electronic warfare, search and rescue, radioactive fallout warning--Rouviere defined the basic missions of tactical control units and described the equipment and facilities required to carry out those missions.

He explained that four major categories of equipment were used in executing air defense tasks: sensors that are generally radars, processing, display, and communications equipment. Thomson-CSF has developed a wide range of products adapted to the characteristics of each problem and to each country's operational specifications. This range of equipment may be placed in four major categories:

a. Radars for fixed installations or mobile radars such as the three-dimentional radars of the TRS 2215 family that are highly resistant to jamming, and the Tiger radar specifically designed for low-altitude detection.

b. Processing units.

c. Display units.

d. Ground-to-ground and ground-to-air communications equipment.

These major items of equipment constitute the basic components of the MIDAS [Integrated Air Defense Ground Environment] systems offered by Thomson-CSF.

Operations Centers Adapted to Requirements

The different center facilities offered are:

a. The main CODA-COC (Air Defense Operations Center-Joint Operations Center). This is a high-level decision-making echelon. It is generally located at or near the field army headquarters from which it receives requests for air support. It operates through two command and control channels: an air defense channel and a tactical control channel.

The air defense channel consists of one or more fixed-site CDCS (Sector Control and Reporting Center) that receive mission allocations and employ them in accordance with directives issued by the CODA. The active air defense means allocated to the CDCS are interceptors and high-and medium-range surface-to-air missiles. The CDCS maintains liaison with the mobile CDC (Control and Reporting Center) to coordinate its actions on the tactical level.

The tactical channel consists of the Joint Operations Center (COC) combined with the CODA. The COC is responsible for the planning of air support for ground operations in coordination with the CODA. It determines requirements and then the appropriate support mission allocations. It is located at or near the field army headquarters from which it receives requests for support.

b. The mobile CDC (Control and Reporting Center) is a subordinate element of the CODA-COC from which it is assigned missions. It is attached to the army corps for short-term operations requiring rapid coordination, particularly relative to the employment of tactical surface-to-air missiles.

c. The CDBA-PDTA (Low-Altitude Reporting Center-Tactical Air Control Post) is a subordinate element of the mobile CDC. It has a dual mission: provide additional low-altitude coverage and maintain tactical control of air support missions.

d. The Electronic Warfare Center is also a subordinate element of the mobile CDC. It is responsible for the detection and location of enemy radars and radio transmitting stations, and also for jamming such facilities.

e. The PGA (Air Control Team) is the last link in this chain of control and reporting centers. Its task is to direct air support strikes onto their targets.

Detection Equipment

Another Thomson-CSF executive, Mr Mondon, then discussed the new generation radars and listed their three main characteristics:

a. Adaptability in coping with changing environmental, atmospheric, and countermeasures conditions, or with different operational requirements;

b. Functional automaticity, in other words, requiring no operator at the radar proper or to perform detection function in the operations centers;

c. Manageability permitting maintenance to be performed by skilled operators and no longer by technicians; a capability resulting from the total automation of the radar's principal functions.

The most characteristic elements of the equipment designed for the coming generation and offered by Thomson-CSF include: the Tiger family of two-dimensional radars especially designed for acquiring targets flying at low and very low levels; and the TRS 2215 and TRS 2230 family of high-performance three-dimensional radars.

Mondon emphasized that both the Tiger and TRS 2215 equipment utilize the most advanced technology in the design of their antennas, electronic transmitters, and information processing circuits. The TRS 2215 transmitter consists of a Tiger transmitter component combined with a 10-kilowatt medium-power final amplifier.

As for the antennas, an essential component of any high-quality radar, both the Tiger and TRS 2215 are equipped with antennas of relatively standard construction but of extremely advanced design as far as their ability to resist jamming is concerned, particularly in the area of the side lobes. Both radars are equipped with an integrated IFF antenna. Despite their excellent performance, these antennas cannot always compete with phased-array antennas that perform much more effectively in a jamming environment.

Mondon then described the main qualities of the new high-performance phased-array antenna recently placed on the market by Thomson-CSF and intended for the 2215D version of the TRS 2215 radar.

Development of this new antenna benefited from the extensive experience acquired in developing linear arrays like those of the reflector-equipped TRS 2215, as well as in developing two-dimensional beam-scanning phase-array antennas. The plane array which constitutes this antenna consists of 50 superimposed beams. The feeds of each of these beams are energized by a symmetrical branch transmission-line system. Since there is absolutely no frequency drift or dispersion in azimuth, this antenna can operate in a pure random frequency, which is not the case with the large air defense 3D radars in current use. Lastly, this antenna has a circularly polarized radiation capability, a most important feature for a radar designed to operate in the 10-cm band. Thomson-CSF considers this new antenna of original-design to be a marked improvement over the present state of the art.

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CSO: 3100

BRIEFS

NUCLEAR SUBMARINE CLARIFICATION--In replying to Michel Debre's question of 5 January 1981, the minister of defense explained--in the 9 March 1981 issue of the JOURNAL OFFICIEL--that the sixth SNLE [missile-launching nuclear submarine], L'Inflexible, will be operational in 1985. He also revealed that the five SNA's (nuclear attack submarines) are scheduled to be placed in active service as follows: the first, Rubis, in the summer of 1982; the second on 1 July 1984; the third in the summer of 1986; and the fourth and fifth, probably before the end of 1987 and 1988 respectively. It will be recalled (editor's note) that future SNA's will be armed with versions of the SM39 missile enclosed in a powered and guided capsule. Debre had also asked: "When will construction of the seventh SNLE begin?" The defense minister answered: "To keep pace with technical developments, studies are now being conducted to examine the future evolution of the Strategic Naval Force." [Text] [Paris AIR & COSMOS in French 21 Mar 81 p 39] 8041

CSO: 3100

TERRORISM

FEDERAL REPUBLIC OF GERMANY

EX-TERRORIST BAUMANN ON HIS EXPERIENCES, VIEWS

Hamburg STERN in German 12 Mar 81 pp 34-38, 207

[Text] Michael "Bommi" Baumann was one of the early terrorists. He was also the first one to quit. "Friends, throw away your arms," he urged as early as the beginning of 1974. Four weeks ago he was arrested. STERN spoke with him in the Berlin jail about his life on the run, about squatters, Greens, punks, and about how the GDR helped him get away.

STERN reporters Gerhard Kromschroeder and Raimund Kusserow had to pass through four checkpoints and a frisking before they were allowed in visiting room 122 in the investigatory prison in Berlin-Moabit to visit Michael "Bommi" Baumann. The 33-year-old prisoner, with a black punk jacket, tight jeans and jogging shoes, was in a good mood. "Things really aren't so bad for me here. The cells here look like hotel rooms in Afghanistan," he said. The man who had been on the run from the police and from his former companions for 9 years had rejected a protracted extradition process and voluntarily allowed himself to be flown to Berlin--to the city where for him, 14 years ago, "everything began." In the STERN interview Baumann spoke frankly. What the former bomb thrower said is dynamite for his ex-companions, for the Alternatives and Greens and for the GDR security service.

STERN: Mr Baumann, do you like it better in the familiar Moabiter prison than in the London jail?

Baumann: Well, I thought I would be extradited no matter what. I also thought I could speak German here, but that didn't work out either. My guard is a Bavarian and the rest are Turks. I got shit on again.

STERN: The arrest order that brought you here accuses you of: membership in the terrorist organization, "2 June," taking part in bank robberies, attempted murder of police and taking part in a bombing attack in Berlin-Gatow, where a man lost his life. What is the truth in all these allegations, anyway?

Baumann: I think the arrest warrant is wrong as it is written.

STERN: What's wrong with it?

Baumann: Well, for example, I wasn't even there at the three bank robberies I am accused of. I have never been in Gatow where the bomb went off--at the most to go swimming.

STERN: But you can only count on leniency if you tell everything to the state prosecutor. Fourteen days after your arrest, your old friend and fellow-terrorist, Hans Peter Knoll was suddenly arrested in Australia. A coincidence--or did you squeal?

Baumann: I knew you'd ask that. No, I didn't. I don't rat on anybody.

STERN: You say you laid down your arms as early as 1971. How many times did you use them?

Baumann: Let's say I used them in order never to touch them again.

STERN: The "Red Army Faction" (RAF) around Andreas Baader, in contrast to the "2 June," really did shoot at people.

Baumann: In the beginning we never thought of shooting. We didn't have a leadership cadre, either, the way the RAF did. We thought of ourselves as a part of the whole leftist movement. Our goal was to support mass campaigns by military actions.

STERN: For example?

Baumann: At that time the American war in Vietnam was going on. So bombs just got thrown.

STERN: Today, squatting is the order of the day...

Baumann: ...well, the way it was then with the "2 June," today a few bombs would get thrown in the squatting cases, probably against a few construction senators or such. But the young people should be told today that this is stupid. You don't have to go underground. I can change things without bombs, too.

STERN: What would you recommend to young people, then?

Baumann: Definitely not a march through the institutions. No use of force, either. We don't need the machine pistol anymore. I think it is good that they are finding new ways to live--by not trying to find a job with an automobile company but by opening an auto repair shop themselves. The leftists today should really fight to see that not one person goes into the underground anymore.

STERN: If you were out there in Berlin today, would you be a squatter?

Baumann: Well, I don't have a place to live. I might.

STERN: All over the FRG squatting has led to real street fights between demonstrators and police, and many people have been wounded. What do you think of this?

Baumann: I can understand this very well, although I don't approve of it. More and more it seems to me today that the policeman who does his work has nothing directly to do with the matter. He wants to get home safely to his family. Why should I throw bombs at him? That's just plain stupid.

STERN: Is this the new Bommi Baumann?

Baumann: I have always thought differently about the use of force than the RAF student asses did. How many mild-mannered intellectuals have I met who were perhaps in their mid-twenties and who had never fought in their whole lives. In our group we all saw a film back then, an Italian western called "Face to Face." It was really a good show. A university professor goes out to the Wild West and meets a bandit. The bandit is shooting his way out because he is about to be arrested. The university professor helps him, and they both take off together. And in the end the professor is worse than the bandid. He doesn't care who he kills. This is the way it is in part in the RAF.

STERN: During the student riots in 1968, Rudi Dutschke was probably the most fascinating figure. Would Dutschke still pack them in today?

Baumann: He would speak to empty houses, because the young people can't stand this ideological political garbage any more. Who is interested in that, anyway? I haven't got a place to live, so I have to find a place to get off the street. Here it is not because there is some kind of war in Asia. The squatters say today: What do I care about Palestine or Karl Marx' letters to Friedrich Engels when I haven't got a place to live.

STERN: It's all well and good to get a place to live, but isn't it possible that under certain circumstances this could lead to the same thing that happened in 1968--namely force that escalates on both sides?

Baumann: It's very possible, but it depends upon the participants. In England, in the houses I lived in, there were also empty places that the government wanted to tear down. They let us use the houses on condition that we renovate them. Then we were allowed to stay there. The English are more liberal and understanding than the Germans. Here stones have to fly before anyone starts to think about a grievance.

STERN: Have you had any contact with your old German companions in recent years?

Baumann: No, I have stayed completely away, I'm not tired of living. I haven't had anything to do with them for 10 years. I completely left the picture.

STERN: Once you said that if Andreas Baader were president, "I would kill him."

Baumann: (laughs): Of course. I would have been the first one that he put against the wall. It would have been pure self-defense.

STERN: Who would you be most afraid of if they were after you, the police or your former companions who were out for revenge?

Baumann: I would be more afraid of certain guerillas. Two or three--I wouldn't want to meet them in the dark.

STERN: Have you ever met them in the dark?

Baumann: I met one of them by chance on the street in beautiful Rome.

STERN: Who was that?

Baumann: I won't say. That's too hot for me even today. Anyway he didn't recognize me, thank God. I got away again. It was just my Karma.

STERN: Karma? Where did you get that?

Baumann: It means divine intervention. I got it in Afghanistan where I learned Eastern thinking. Everything that has been important for us up to now doesn't exist for the people there at all. The passport official gave us a form to fill out, and under "Profession" the people write agent, and in the space, "Purpose of Trip": espionage. He looks at it and would just as soon throw it in the wastebasket. He's not interested in it at all.

Then I went into a bank. It was just a shed with the sign "Bank" over it. I went in and nobody was there. The safe was in the corner. It was funny - me, wanted for bank robbery, alone with the money chest. Then one of these Afghanis came up and asked me in his broken English what I wanted. I said: "To exchange money." He almost died laughing. I asked, "What's there to laugh about?" Then the Afghani said: "Listen here, first you have to go on the black market. The rate is much better there. In the second place I haven't had the key to the safe here for 3 years. I can't change anything anyway." Things like that happen to you all the time there. The people are just crazy. This was all before the Russians came.

STERN: Bommi Baumann, the bomb thrower from Berlin, on the way to new self-discovery? Were you perhaps in Poona, too?

Baumann: Yes, I drove through there quickly. I knew Baghwan before he drove around in a Rolls-Royce reviewing his disciples. In 1972 he was sitting in the Sea Green Hotel on Marine Drive in Bombay as an unemployed professor. They had kicked him out of the university. Baghwan sat down calmly in this apartment

house where passing foreigners live and listened to their problems. Some time or other he said to himself: "These people can be helped."

STERN: And did he help you?

Baumann: I don't need any jet-set guru. I don't need an organization like that either. They even have a uniform. And they are also told how to act. Isn't that great?

STERN: In the last 10 years you have often been arrested--but somehow or other you have always got off. Were you in Germany, too?

Baumann: Yes, in the GDR. I was there in the beginning of 1973 on the train from Czechoslovakia on my way to West Berlin. There was something about my fake passport that they didn't like. They suddenly started to hold my identification card under the light. They they saw right away of course that it was forged. Then they arrested me and took me to Dresden.

STERN: Why to Dresden? What did they want from you?

Baumann: They think anyone who comes in with false papers is helping people escape to the West. They were about to give me 2 years. But then I said: "I'm Bommi Baumann, you must know me." After all, I come from the East. I told them exactly how and where we lived then. They checked it all for a week until they realized it was really me. Then the state security service [Stasi] took over. I was put in the Stasi prison in Berlin-Niederschoenhausen. One morning two gentlemen came into my cell, gave me back my false passport, and sent me on the train to West Berlin, by way of Friedrichstrasse.

STERN: Why didn't the GDR turn you over to the police in the West, since you were wanted as a terrorist?

Baumann: I really don't know. At any rate, they didn't just do this with me. They let Baecker* and another guy, whom I don't want to name, off just as easily.

STERN: What did you want to do in West Berlin? Meet old friends?

Baumann: No, it had to do with my book, "Wie alles anfing" [How Everything Began].

STERN: In the meantime, that book has sold about 100,000 copies. You are something of a bestseller author. Have you been living off the proceeds of your book all these years of exile?

Baumann: I hardly saw any of that. Naturally I got a mark or two out of it now and then. I think about 200,000 copies have been sold. But the publishing house was very stingy in paying. I couldn't do much with that.

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*The miner, Hans-Juergen Baecker, who was sought as a terrorist, was sentenced in 1974 to 9 years prison for bank robbery and membership in a criminal group.

STERN: And where did the rest come from?

Baumann: I had various jobs. For example, I was a disc jockey in a bar in an Italian resort that mainly American hung around, and I helped with the grape harvest. I worked as a farmer. What I could get at the moment. I even worked a little as an actor in 1975.

STERN: What? As an anarchist, maybe?

Baumann: On the contrary. At first they engaged me for a very small role--that I was really made for: I was supposed to play a policeman. But then the film people noticed that I was the only one in the troup who knew English. And than I got a speaking role. I got the part of an English lord who was kidnaped by the Italian anarchist, Carlo Pisacane. There really was an Italian anarchist like that in the last century. He wanted to ransom 300 comrades. Of course everything went wrong--in the movie. It got a lot of prizes and even played in Cannes and at the biannual in Venice. It was called "How Nice To Be Killed."

STERN: And here at Moabit--is this Bommi Baumann's last appearance?

Baumann: No, not by a long shot. First I'll write another book...

STERN: ...Entitled: "How Everything Stopped...?"

Bauman: ...at most: "How Everything Goes On!" I stay calm and happy, really, I meditate. The Soufis, the holy men in Afghanistan, say that the whole world is only a caravanserai. a resting place.

STERN: Well, you have had quite a few resting places: Commune I* and then the "2 June" movement, then Afghanistan. And according to the outfit you have on now, you are a punk.

Baumann: I'm a very normal guy from Berlin. It's what I've always been, someone from the streets of Berlin. I started with street music at the Memorial Church. And here I am again with rock'n'roll. I wanted to make a record in England. But the police got there first. The punks are not so bitter and irritable and worried, not as narrow-minded as the student asses from the extraparliamentary opposition.

STERN: Many students from this period are with the Greens today. Wouldn't this be something for you, too?

Baumann: Greens--no thanks! That's not for me. They seem a little like garden dwarfs to me. Country communes in Luechow-Dannenbert. I'm not a cow. It's nice

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*"Commune I" was the first one in West Berlin. It was formed during the student riots. Its most prominent members were Fritz Teufel, Rainer Langhans and Uschi Obermeier.

to see a few trees now and then. But I can't live in the country. I'm a big-city person. In India I always ran to Bombay. A valley in the Himalayas is fine, but after a while it gets too boring for me.

STERN: Fritz Teufel said: "We must make Berlin into a large commune." Would this make you take part again?

Baumann: For all I care, he can grow strawberries on the Kurfuerstendam. Why do they have to make another commune? If Fritz Teufel ever really becomes mayor of Berlin, then I will have to deal with him, too. After all, I am a citizen of this city.

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ENERGY ECONOMICS ITALY

OFFICIAL DENIES ENERGY PROBLEMS ALLEGED BY 'ENERGIA'

Rome ENERGIA in Italian Mar 81 pp 70-75

[Letter to editor by Prof Giuseppe Ammassari, head of the General Directorate of Energy Sources, Ministry of Industry; reply by ENERGIA Editor-in-Chief Romano Prodi; for reference article, see JPRS L/9557 of 19 February 1981, West Europe Report series, titled "Overview of Nation's Energy Situation" pp 2-19]

[Text] Dear Editor:

Among the things of greatest interest I have had the opportunity to read, since the end of the summer vacation period, is something published in the first issue of ENERGIA magazine, namely, item number 10 dedicated by the IEFE to the "Subject of Electrical Energy Tariffs and Control of Demand" and the Report by the Olivetti Foundation Center for Studies on the "Nuclear Question and on Legislative Policy."

Recently, of course, the energy question has been addressed by a great many magazines and is the object of evaluations and studies by many research centers and study centers. We are grateful to them all for their views, their comments and their criticisms, which are always useful and always stimulating on a subject of this complexity.

It is my custom to take note of the substance of the comments that reach me from the outside and, if I find them convincing, to make the appropriate corrections in the operation of the General Directorate, without making of them the object of a reply.

With respect to the first issue of your magazine, however, published under the sponsorship of a respected entity, that of the Automobile Club of Italy, I find myself compelled to make an exception to this self-imposed rule, in order to furnish some answers to the many questions that have been raised concerning the operation of the General Directorate, and to also make some comments of my own, if I may, and request clarifications on the suppositions that are being advanced.

First, let me say that I am gratified by the decision to publish a new magazine the object of which is to make available, besides many articles and documents, statistical information as well.

I am certain that readers cannot be lacking if the information the magazine intends to publish is timely, accurate and, above all, objective and impartial.

I have the impression--mistakenly, I hope--that some parts of the first issue are lacking in objectivity of viewpoint and hence lead the magazine to conclusions that cannot be called accurate interpretations of the facts.

Permit me to dwell on some points contained in two articles "The Introduction" signed by you and Alberto Clo, and "The Italian Energy Situation: Problems Old and New" signed by Alberto Clo:

1) Status of publications and information in the possession of the Ministry of Industry: Let me start by pointing out the lack of factual basis for the affirmation that the BOLLETTINO PETROLIFERO disappeared from circulation or that it is 18 months overdue. The fact is that this publication was distributed prior to the start of summer vactions and contains a quite analytic survey of the behavior of the national oil market during 1979.

Next week, moreover, two issues combined into one of the magazine L'INDUSTRIA DEL PETROLIO, the publication of which had stopped, will be published. In my view, this publication, in its new edition, provides information and news never compiled heretofore, with substantial quantities of detail and analysis. I do not exclude the probability that the content of the two above-mentioned publications will be improved in the future; for the moment, however, this is not possible because of the Directorate's limited staff, which consists of 103 persons, of which only 24 hold college degrees and all of whom are quite busy, I assure you.

The article to which this refers raises the question of whether the General Directorate possesses the necessary information to reach or to enable the Minister to reach the proper decisions, and of why such information is not released to the public domain.

The government undoubtedly has information in addition to that which it makes available to the above-mentioned publications; I refer to information in the form of greater detail and related to international situations, facts and strategies of a financial nature on which the government is duty-bound to place restrictions.

The government has instituted a system for gathering actual and estimated analytical data, through a report each month covering a 4-month span (1 month's final figures, 1 month's semifinal figures, 2 months' projected figures), for each operator and for the country as a whole, relative to the following rubrics:

a) characteristics of the crude and of the oil products being imported;

b) quantities being put on the consumer market at the provincial level.

In addition, the Directorate receives and analyzes:

c) projected annual supply plans followed by quarterly and semiannual updates for each individual operator;

d) semimonthly reports of unsold and reserve stocks on hand for each operator and each individual installation.

2) Policy decisions and measures adopted by the government: The Introduction affirms, "many of the fears and alarms raised on the scarcity of oil supplies being shipped to our country (owing, it was said, to the Iranian crisis and to domestic and international price differentials) have proven for the most part unfounded, as has been amply demonstrated by the net increase in reserve stocks."

The foregoing affirmation is contradicted by the facts; allow me to comment on it as follows:

a) The 1979 annual plans submitted by the operators clearly reflected the effect of Iran's absence on supplies; further to the annual figures, which were certainly significant, the monthly report of 3 February and successive ones of 3 March and 3 April showed that the amount of incoming crude was dropping rapidly and that the demand was being filled solely from existing stocks. All of this was reported to the ministers of industry in time for appropriate decisions. I must recall that several months went by without any action being taken, possibly owing to the nearness of elections.

b) Despite the Iranian crisis, domestic consumption during the first 6 months of 1979 was exceptionally high by comparison with the same period in 1978 (first quarter: gasoline +4.9 percent, gasoil +6.8 percent..., total product +3.2 percent; second quarter: gasoline +11 percent, gasoil +2.2 percent..., total product +5.5 percent).

c) The decreased rate of incoming crude was insufficient to restore to the refining cycle its stocks of crude and semi-distillates, which, after having reached their lowest level in the last 10 years in April 1979, showed no tendency to regain their normal levels; as a matter of fact, stocks, in millions of tons, as of 30 June and 30 September were, respectively, in 1977: 11.87 and 11.86; in 1978: 11.20 and 11.48; in 1979: 9.26 and 10.68; and in 1980: 10.71 and 12.70.

d) President Theodoli's alarmist statements on the unavoidable gasoline shortage (and on the imperative need for a gasoline price increase) were consistently contested by the government, which asserted that quantities were sufficient, despite even a sharp rise in demand.

In October 1979, Dr Theodoli admitted that the quantities of gasoline had indeed been sufficient to cover the country's needs during the summer months.

The government's fear that the full pressure of demand might end up being borne entirely by the two most critical products, gasoil and fuel oil, was not unfounded.

Even as the ENEL [National Electric Power Agency] was authorized to buy fuel oil on the foreign market, in the interest as well of maintaining a substantial balance between domestic and international prices, the problem of how to resolve the gasoil shortage was already looming.

The slowdown in arrivals of crude, the status of stocks, the increase in quantities entering the consumer market as compared to the preceding year, the domestic ex-refinery price level ($192,78/ton) as compared to those on the international market ($362.28/ton): these all led the CIP [Interministerial Price Committee], at the end of July, to take steps to increase prices, which included, with respect to gasoil alone, the authorization of an additional 17 lire per kg in exchange for a specific commitment by the operators to increase by 15 percent the quantities they planned to put on the consumer market. Immediately following the summer vacation period, the crisis that had beset a major national market operator brought to the surface again the problem of insufficiency of quantities to cover needs. The minister brought the situation to the attention of the Energy Committee and then to that of Parliament: Despite the steps that had been taken to contain consumption, it was estimated that the gasoil shortage would reach 800,000 tons for the entire 1979/1980 winter season, and the noted decision was taken to set up an adjustment fund to facilitate the importation of that product, for which 50 billion lire were appropriated, and under which the ENI [National Hydrocarbons Agency] was authorized to import 425,000 tons, the international companies 232,000 tons, and the Italian independents 43,000 tons.

It must also be remembered that the recognition of the gasoil shortage before it actually became operatively apparent in the various Italian provinces, relating to the supply vacuum caused by the absence of a major domestic oil operator, made it possible to meet the situation head-on, by the appropriate shifting of stocks from one province to another, to intervene in good time based on the hundreds of signals received from the various prefectures, and to cover the needs of the distribution network, which was leaving its weakest and least lucrative points exposed: public housing, schools, etc. Was this then a crisis or an invented one?

Not only, therefore, was there a 1979/1980 winter gasoil crisis, whatever your magazine may think of it, but the crisis was also recognized in good time on the basis of forecasts of available quantities and of consumption.

With regard to this difficult period and to the timeliness of the information provided, I should like to call your attention at least to the measures passed by Parliament, from which it emerges that the minister of industry has consistently and in good time kept Parliament informed on the supply situation and on the steps being taken (27 Sept 79, 4 Oct 1979, 13 Dec 1979, 20 Dec 1979, 28 Feb 1980, 12 Mar 1980, 6 May 1980, 26 May 1980).

3) Other Inaccuracies Found

a) The measures to contain consumption were not decided in November as was erroneously stated in the article, but on 14 September 1979.

b) In the table on page 49 showing energy consumption in millions of equivalent-oil tons--in the comparison between the first quarters of 1979 and 1980--it is not understandable how the energy consumed in 1979 was arrived at (I suppose by taking the difference between the primary sources total of 75.9 and the consumption and losses total of 8.1).

For 1980, the value of energy consumed does not follow from the two aforementioned quantities.

c) The statement regarding the movement of stocks on hand is not very accurate when it complains that reserve stocks in Italy did not reach the levels found in other European countries; during the third quarter 1980, our stocks reached a level never before recorded; on this point, I must also recall that the government has drafted a bill providing for the setting up of strategic reserves, the cost of which is to be borne by the state, as occurs in other European countries. Unfortunately, as of today, the bill has not been approved by Parliament.

d) The statement that the only agreement signed by our country with another country was, at the time, Venezuela is not in accordance with the facts. It overlooks other agreements, as for example with Libya, Iraq, etc.

e) Other comments are made with regard to the kinds of imports, the level of use of installations, and the drop in exports, ascribing all of these to speculative behavior on the part of the market operators and to scant monitoring on the part of the government.

These problems warrant a more objectively based examination. The causes that have led to these complaints, and that, among other considerations, do not all present negative aspects, are many and more precisely as follows:

--Since the third quarter of 1979, a major independent operator has gradually reduced his share of the market, phasing it out completely at the beginning of 1980. Some major petrochemical enterprises have done likewise. The other operators who have had to fill in on the market to cover the demand have probably not been able to modify their working plans accordingly and have consequently had to resort to the import of finished products.

--As has already taken place in other European countries, Italy has also begun to consider the refining cycle from another standpoint. Topping, which was at one time a qualifying function of a refinery, has now taken a secondary place; today, a refinery qualifies if it has conversion plants. Consequently, the operator seeks now to make maximum use of cracking and viscosity breaking processes, and to offset a barrel of product with a barrel of consumption he must import intermediates and finished products. The very energy plan the government is about to examine proposes as an objective the gradual reduction of the consumption of fuel oil, leading in turn to the gradual abandonment of topping capacity and the increase of conversion capacity. Cosideration is also being given to the possibility of using excess topping capacity for foreign accounts, but that is not

easy; other Western European countries also have excess topping capacity--very recently, in fact, a major international company has decided to suspend operations in three of its European refineries--and besides, foreign buyers, for reasons of profitability, seek topping capacity combined with conversion capacity.

--An effort was made, therefore, to make up for the scarcity of crude by discouraging exports by domestic operators. The status of reserve stocks in the country as of 30 September 1980 would have enabled a slacking of controls, but in the face of the most recent crisis between Iran and Iraq, the government not only decided not to alter its policy but in fact requested and obtained the agreement of the EEC to again place the system of controls on the export of products to the Community area.

I find therefore that the reasoning developed on page 54 exactly reversed. One need only, in fact, articulate the behavior of the market with that of the ENI, the major international operators, and the domestic operators, to realize that although on the one hand some plants did experience very high utilization levels, on the other hand, to the extent that some major domestic operators experienced a shortage of crude, exports dropped and imports rose sharply because the market demand as a whole had in any case to be covered.

Allow me, dear Professor, also to express, with my customary frankness in dealing with my relationships, my sense of bitterness. Certainly, anyone can be uninformed, or can express different or opposite opinions to my own, since I lay no claim to being one of the infallibles in matters of energy. But surely, one who like yourself has had occasion to head, and hence to also know, this administrative agency, might perhaps have been expected to have a different opinion of it than the one expressed in the Introduction.

Thanking you for the hospitality of your attention, I shall be grateful if you will be good enough to publish this letter in the next issue of your magazine.

Please accept my best regards.

[signed] Giuseppe Ammassari, Rome, 1 November 1980.

Reply

In the Introduction to our first issue of ENERGIA, we expressed the conviction that the task we had undertaken in the field of national energy information (seeking in particular to bring more light to bear on the oil market) could be accomplished only through the broadest possible cooperation from those who--in their various capacities--are involved in this sector. We are gratified therefore to welcome this contribution from Giuseppe Ammassari, director general of Energy Sources in the Ministry of Industry since 1974, who, though critical of some individual points in our analysis, confirms in substance the concerns we expressed regarding the deterioration of the domestic energy situation: squeezed between, on the one hand, continued international instability with adverse effects on prices and quantities, and, on the other, continued inoperativeness of domestic policies. The importance of the issues addressed and the analytical nature of

the criticisms formulated by Professor Ammassari require an equally particularized response, which we set forth as follows, point by point in the order in which they were taken up in the letter addressed to us.

1) Status of Publications and Information

On this issue, Professor Ammassari confirms the serious delays that characterize the distribution of official information by the Ministry of Industry in the field of energy, to say nothing whatever regarding its completeness and quality. To be more specific, the BOLLETTINO PETROLIFERO's 1979 quarterly issues were not circulated until the end of September and beginning of October 1980, containing information dating back as far as 18 months previously, whereas the combined issues of the more analytical L'INDUSTRIA DEL PETROLIO, which Professor Ammassari mentions will be coming out "next week," were found to relate to the 1977-1979 3-year period with a delay of up to 36 months. Putting aside these specific aspects, however, the basic question raised was certainly not "whether the Directorate possesses the necessary information"--as Professor Ammassari appears to have understood it--we being well aware of the massive volume of statistics that the system of authorizations to which each and every oil production and marketing activity in Italy is tied requires the enterprises to furnish continuously to the General Directorate (as we pointed out on pages 49 and 58).

The question raised concerned instead the negative consequences that could derive from the scant (if not nonexistent) divulgation of such information (even the unrestricted) not only abroad but also, and more importantly, within the state organizations whose responsibility it is to carry out the energy policy. The restrictiveness to which Professor Ammassari claims to be "duty-bound" appears to us exceedingly zealous when we compare it with that of the governments of other countries. The French and the English governments, for example, publish (in quantity and quality) the analytical data relating to their energy balance sheets with a delay of only 45 days, whereas the U.S. Department of Energy publishes them with a delay of barely 1 week in its WEEKLY PETROLEUM STATUS REPORT.

2) Policy Decisions and Measures Adopted by the Government

The details furnished by Professor Ammassari, but even more so the BOLLETTINO PETROLIFERO circulated in October by his services, confirm the accuracy of our analysis with respect to the actual situation as to the availability of oil (relative to needs) throughout the 1979 time span--a more positive situation than the one that was being painted at the time.

This is confirmed by the fact that during 1979 reserve stocks of products in the hands of consumers increased by nearly 500,000 tons, while those of crude in the hands of the producers increased by approximately 700,000 tons. During the second half of that year, a period in regard to which the gravest concern was being expressed, these figures rose to 1.7 million and 1.0 million tons respectively.

An increase in reserve stocks is exactly the opposite of a short-supply situation. For greater clarity, we reproduce herewith the figures of the 1979 BOLLETTINO PETROLIFERO (page 40):

Reserve Stocks in Hands of Consumers: 1979
(in thousand tons)

	1st Half	2nd Half	Year
Gasolines	-	- 20	- 20
Automotive gasoil	-	-	-
Heating gasoil	-1,010	+1,710	+700
Fuel oil	- 219	+ 21	-198
Total	-1,229	+1,711	+482

Let us recall also that most of the concern over supply shortages was centered on gasoil, with regard to which a second-half-year shortage of 2.7 million tons had been projected (according to the document "Energy Availabilities, etc" of June 1979 p 50).

Professor Ammassari himself, in reminding us of the measures adopted to "resolve the gasoil shortage," confirms the fact (though not an incomprehensible one) of an error in projection (of almost 18 percent) of the final-demand dynamic for this product. At the end of July 1979, the enterprises were granted a "price add-on" of 17,000 lire a ton for gasoil (which produced, among other things, a sliding wage scale index rise of approximately 0.35 points) with "the undertaking to increase the quantities released to consumption by 15 percent": an increase 3.5 times greater than that of the first half-year, despite the fact that there had already been a real price increase of over 40 percent since the beginning of the year. Another measure adopted was the instituting of an adjustment fund (proposed in D. L. No 438 of 14 September 1979 in the amount of 50 billion lire and approved definitively by Law 178 of 16 May 1980 in the amount of 57 billion lire) to facilitate additional imports of gasoil by the enterprises.

The increase in imports and availability of gasoil that actually took place in the second half of the year, though less than the amount funded, nevertheless increased (and this is the point) gasoil reserve stocks held by producers by 60 percent and those placed on the consumer market--for the purpose, however, (as was said) of increasing the reserve stocks held by consumers--by 40 percent.

The fact that Professor Ammassari still defends the accuracy and the "foresight" of the evaluations made at that time (ex post facto figures to the contrary notwithstanding), and actually sustains that the different trend of events was owing to the effectiveness of the measures put in being, attests not only to the totality of conviction that actuated him but also to his less than full awareness of the unfolding of the international and domestic market mechanisms. We do not mean by this to say that fear of the crisis was the product of a pure invention, but rather one of errors in evaluation, for which the uncertainty of the international situation bears its share of the justification.

Gasoil Balance in Italy in 2nd Half of 1979
according to Projections and Final Figures
by Ministry of Industry (in thousand tons)

	Projections (June 1979)	Final Figures (October 1980)	Difference	Percent
Availability	10,102	13,128	+3,026	+29.0
Shortage(-)/Surplus(+)	- 2,698	+ 864	+3,562	
Put on consumer market	12,800	12,264	- 536	- 4.2
Final consumption	12,800	10,554	-2,246	-17.5
Reserve stocks held by consumers	-	+1,710	+1,710	

3) Other Inaccuracies Found

a) It is true that the consumption control measures were approved on 14 September 1979 by D. L. 438, as we stated on page 50, but it is also true that they did not enter into effect as of that date but rather on 1 November;

b) The error on page 49, which Professor Ammassori so kindly pointed out to us, is obviously a printing error (1.8 instead of 7.8) as is clear from the correct percent variation alongside it;

c) Having completed the article to which Professor Ammassari refers in July 1980 (as is stated in our magazine), its span of analysis could clearly not cover the third quarter of 1980;

d) The uniqueness of the development agreement with Venezuela lies not only in its substance, which is highly innovative on the international scale, but also in its being the sole case of a political agreement--and more this than a trade agreement at that--being initialed in advance at an intergovernmental level;

e) The major modifications made in the supply flow in 1980 (less crude and more products) and the negative implications in them that we felt it proper and needful

to point up stem not only from reasons of a speculative nature but also from those of a company nature that are obviously not always compatible with interests of a national nature. It is obviously difficult to verify this congruency (and to enforce it) through the control organizations, given the modest staffing at their disposal (barely 103 persons, of which almost half are from public agencies that are subject to the controls these persons are expected to exercise), a situation which Professor Ammassari himself rightfully points out is distressing.

As regards the policy change with respect to refining patterns, favoring now the upgrading of conversion plants--for a higher relative yield in intermediate fractions--we could not be more in agreement. We need only stress that it is a welcome change in policy that comes after the government has for years categorically refused to authorize investments in this sense which the companies have been seeking to make--refusals that have impaired the economic viability and competitiveness of our industry.

These, dear Professor, are our analytical comments on your observations, for which we are genuinely grateful, since it is our belief that in our country there is more and more need to know the real facts of our problems and to debate them openly and in depth.

We are certain therefore that this exchange of views, precisely because of its many divergences and convergences, has been extremely helpful toward a better awareness of the Italian energy reality.

Lastly, we would like to add that it was not and is not our intent to slight the merits of the government or to underestimate the operative difficulties in a field that requires organizational flexibility and ample availability of funds, characteristics both of which are incompatible with the constraints currently being imposed on the Italian public structures.

No one appreciates more than we the difficulty of your operation and the scarcity of funds available to it in the face of the vastness of its objectives.

We hope therefore that an initial bitterness will not impede a fruitful cooperation aimed at broadening more and more our understanding of a situation as complex as is the Italian one in the field of energy. Since our objectives and our motivations are identical, we believe our work in this respect will be, at least insofar as concerns the issues, complementary and mutually helpful.

In thanking you for your valuable contribution to the improvement of our magazine, I am pleased to express to you my warmest regards.

[signed] Romano Prodi

(editor-in-chief)

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ENERGY ECONOMICS ITALY

PROBLEMS OF COAL SUPPLY, LOGISTICS FOR 1980'S

Rome ENERGIA in Italian Mar 81 pp 40-51

[Article by Oliviero Bernardini of Montedison, Srategic Coordination: "Logistic and Market Problems of Coal Supply in Italy in the Eighties"]

[Text] Premises

Italy has never had a great inclination toward the use of coal. Differently from most of the other industrial countries, it did not have sizable domestic resources and, in the past, it barely skimmed off this source. In fact, for its first industrial development, the country was able to tap its relatively vast hydroelectric potential. Then when the margins of utilization of the so-called white coal began to diminish, oil and natural gas came to prevent a process of adaption to the uses of coal from starting in depth in Italy. In a country so well located with regard to the Mediterranean areas of oil and natural gas supply and so far from low-cost coal deposits, there absolutely seemed to be no more room for coal to play an important part.

The problems raised by the recurring, but constantly more credible, forecasts of the approach of the end of the oil area seemed solved, moreover, with the promise of an abundance of nuclear energy, whose development Italy had advocated at the start among the first in the world. Therefore, on the eve of the 1973-1974 energy crisis, coal was an energy product rapidly going out of use in every sector of Italy's economy, with the exception, naturally of metallurgy.

These and other factors often of a psychological nature explain a large part of the lag with which this country moved on the path to coal. It suffices to think that, in the First National Energy Plan (PEN) that came out in 1975, and therefore already a year after the energy crisis, coal was practically not mentioned, while a program of fuel-oil-fired powerplants with a good 10,000 to 14,000 megawatts was initiated thoughtlessly. The Italian system had, moreover, frozen on a view of the future hinged on nuclear energy. It was the period in which forecasts of 20,000 megawatts nuclear installed by 1985 and 60,000 megawatts by 1990 circulated freely!

But something was in the air already in 1976. Suddenly the decline in coal consumption in cement works stopped while the start of a resumption of consumption in electric powerplants became evident. Coal was still, however, something theoretical. The assumptions of the WAES[1] [expansion unknown; possibly World Alternative Energy Strategies] study proposing an increase in consumption from 13 million tons coal

equivalent (Mtce) in 1975 to 16-20 Mtce in 1985, up to a maximum of 47 Mtce in 2000, including 31 Mtce in electricity production, were received with much circumspection.

At the end of 1977, prospects for nuclear development in Italy, just as in every country moreover, were considerably revised and Italy had begun to move timidly, if not downright unwillingly, in the direction of coal, with an initial endeavor to transform 3,100 megawatts of bivalent power, in order to bring coal consumption to 5 million metric tons (Mt) by 1980. In that year, also cement works, equipped for handling and burning coal were able to respond quickly to the price advantage in comparison with fuel oil by quadrupling their consumption, with a definite reversal of a trend that had been going on for 20 years.

It was, however, only after the second energy "shock," caused as a result of the 1979 revolution in Iran, that there was in Italy an actual, general recognition of a chronic state of vulnerability characterized no longer only by the rise in the price of crude oil, but also by limitations in its availability. In fact, the energy problem has entered a new phase of tension characterized by the possibility of sudden and potentially lasting interruption in oil supplies.

The electricity sector was the one most exposed among the production sectors. The plans in effect and especially the obstacles appearing constantly on the nuclear development front, now cut down to the bone, did not even leave much hope of containing a dependency on oil by already very high limits of 60-65 percent. For postponement of the ENEL [National Electric Power Agency], CIPE [Interministerial Committee for Economic Planning] gave, it its directive, a quantitative indication of the objective of reduction of oil consumption for the production of electricity, inviting ENEL to examine the possibilities of not exceeding, in 1990, its 1980 fuel oil consumption.

It is, however, no longer a question of precautionary guidelines. Although there might be room, in the first half of the 1980's, for an increase in Italy's oil consumption, perhaps even up to a maximum of 115 million tons oil equivalent (Mtoe), the situation is, however, destined to become worse in the next period. In 1990, the amount of oil on which Italy can count -- always with a certain degree of optimism -- and beyond which it would not be advisable to program, is on the order of the amount of present consumption and certainly not more than 105-110 Mtoe.

There are the principal stages with which this country has moved on the road to coal, not, therefore, as a free choice, but out of compulsion and necessity. In fact, now coal represents for Italy the final hope against a future of difficulties in the economic apparatus and of spreading of social tension.

The uncertainties and the delays of the 1970's have been tranformed by the 1980's into a situation that can be regarded with serious if not dramatic prospects. In fact, there is no longer talk of an objective growth rate in income of 4.5 percent a year, as in the First PEN and still in the Second PEN. There is no longer hope for a 3.5 to 4 percent growth rate, as in some assumptions in the government plan just started. In fact, now there no longer seem to be energy premises for an annual development greater than 3 to 3.5 percent on the average between 1980 and 1990 and even this only in the following assumptions:

[1.] Drastic rationalization and saving measures of the final uses of energy, in order to reduce consumption by 20 Mtoe, or 10 percent of the overall requirement.

[2.] Development of nuclear energy at the rate of 8,000 megawatts of new facility that would replace over 9 Mtoe of oil.

[3.] Very intensified development of use of steam coal, whose imports from third countries should amount to 48 million metric tons a year by 1980, equivalent to about 29 metric tons of oil.

As is well known, it is a question of the conditions of the Third PEN. If one single one were to decline, the country might risk entering a phase of zero or even negative growth. Nevertheless, one of them has an especially high probability of being fulfilled, because of which the combined probability, with regard to the overall success, must be regarded as relatively low. For example, assuming a deficit of 20 Mtoe in 1990 distributed at random among the three conditions, the most likely scenario for the 1980's would be an increase in income that would range on the average around 3 percent in the first 5 or 6 years to become then stably negative (less than -1 percent a year) on the average in the last 4 or 5 years.

In this situation of precariousness it goes without saying that every effort should be made so that each condition will have the maximum probability of success. Time is so limited both for stating and for organizing and starting the strategies for attacking the problem that each one is destined to fail, if maximum attention, the maximum degree of technical competence and maximum political awareness are not devoted to space and time phasing of the requisite actions and operations and to their physical and organizational support and also to the associated problems of a social and environmental nature. These aspects will be examined briefly, below, with regard to the case of coal logistics understood in the broadest sense of the strategy for the 1980's.

Problems of Coal Logistics in the 1980's

The 1980's represent for Italy the decade of takeoff in uses of steam coal. From a consumption of around 5.5 million metric tons in 1980[2], there should be an increase to a consumption of 48 million metric tons in 1990. There, it is more a question of a particularly strong stimulation rather than of a takeoff. In terms of acceleration in the physical handling of material, only a comparison with oil can be found, whose imports increased from 10.7 to 45.7 million metric tons a year between 1955 and 1965. A valid comparison is involved in that the systems of sea transportation in the period had already attained considerable size with the use of tankers with a gross deadweight tonnage of 100,000 to 150,000 tons. However, the considerable differences between oil and coal should be pointed out. One is liquid and the other is solid. This makes the transportation and handling problems completely different.

Although the speed of transportation may be very similar, in fact, the complexity and the transfer times between the various phases in the coal cycle are considerably greater.

Nevertheless, it would be wrong to think that the problems of coal logistics in the 1980's are reduced to the single question of organization of physical movement from

the point of origin to the point of final use. In a period of such strong growth and in such short times, it is not sufficient to take into account merely the static-space dimension of the phenomenon, optimizing the use of the means in the short times of the regular operation of transports, as if every part of the system were always and at every moment in a state of perfect, optimum balance. The problem of the dynamics of building up to speed emerges in all its priority when it is realized that the technical times for starting some of the more basic phases of the coal cycle are on the same order of magnitude, or slightly less, as the total period of increase, which is barely a decade.

For example, 4 to 8 years are needed between conclusion of negotiations and bringing a mine to full production rate. A railway connection or establishment of a new line may also require 3 to 5 years, if time is included for settling legal disputes on right-of-way. Four to five years are needed, and in some case even longer, for approval, construction and startup at full operation of a large export terminal and the same for an import terminal. Even a medium-sized port, sufficient for supplying a powerplant, may require 2 years, if there are no delays of an administrative nature. Construction of a large collier takes not over 2 years, but establishment of an adequate fleet for satisfying the demand for coal anticipated in Italy and in the world by the end of the 1980's may take 6 to 8 years. A coal-fired powerplant can hardly be ordered and built in less than 7 years.

Obviously, most of these phases can be carried out simultaneously for which it can be thought that there should not be problems of a strictly technical nature. Nevertheless, the fact should be pointed out that at the start of the period there is no "master plan" shared by all the participants involved during the entire coal cycle, from the starting point to the final use. Instead, many of the phases for establishing the supply system are sequential, to the effect that it is not possible to start one without having first decided on the other. For example, mines will rarely be opened, if there is no definite demand for their coal. Ships will not be built, if there is no definite feeling that they will be used, a feeling that the sector operators may perceive only if sufficient signals come in from the other components of the system. And a few messages, like the obstacle to installation of powerplants, are sufficient to create mistrust by one party of the other in the chain, delaying the whole process. The large number of decision-makers with different objectives and interests, the numerous phases in organization of the coal cycle and the probability of slipping, even merely for technical reasons, characteristic of each of them, make fulfillment of a plan for an intensive development of the use of coal in Italy difficult to bring about in the limited space of only 10 years.

Therefore, for an examination of the logistic problems of the 1980's it does not suffice to take into account merely the problem of handling and transportation with development completed at the end of the period. Under the conditions raised by the limited time available that characterize the Italian plan for coal, organization of logistics must take into account both achievement and proper functioning of the coal cycle, which must exist in each year of the period to cope with the country's needs, and an adequate time phasing of all those actions needed for checking the development dynamics during the entire period. In other words, it is necessary to solve the problem of how to arrive from there to here, from today to tomorrow, optimizing not only in a space and static dimension of the problem, but also and on a priority basis in a dynamic and time dimension. This last one mentioned is the real "logistic" problem of coal in the eighties and failure to realize it might mean failure of the entire strategy.

Present Situation

The still relatively low consumption of steam coal in Italy has not raised great problems, either with regard to market availability or to the logistic phases of transportation and importation. Up to now, Italy has based its supply exclusively on commercial supply contracts, often of a multiyear nature. That was facilitated both by the still relatively small quantities of steam coal imported into Italy (barely 7 percent of the amount that enters in international commerce), and by the present excess of supply in almost all the major producing areas in the world. The leading supplying countries are still South Africa and Poland, although supplies from Poland were considerably reduced in 1980 owing to blockage of the Baltic ports. Most of the coal arrived by sea in ships of 25,000 to 40,000 deadweight tonnage directly to the docks of ENEL's powerplants, part to the public wharf in the port of Savona, shipped primarily to the cement works in Piedmont and Lombardy, and finally smaller amounts in other ports.

In this phase of very first start, great problems of a logistic nature could not come up, in view of the small amount of coal involved. Nevertheless, some events that occurred already during 1980 bring to light the precariousness that is present, even in the short term, during the entire coal cycle, owing to the scanty margins of flexibility characteristic of the present situation of accelerated transition both in Italy and in the exporting countries.

In particular, the piling up of some apparently disconnected events, like the mineworkers' strike in the winter of 1979-1980 and the especially severe winter itself that practically blocked port operations in the main ports of the United States, proved to be rather insidious for the normal development of the logistic chain of coal. In turn, Australia, overcommitted with regard to its own export capability and also because of port strikes, saw its suppliers compelled to rescind a number of European contracts selected among the ones least advantageous, creating by repercussion a considerable increase in demand in the United States that added to the delays accumulated in the winter months. Added to this is the fact that South Africa also is experiencing serious bottlenecks and delays at present in coal exports, and, in addition, the strikes that occurred in Polish ports also reduced the amounts of steam coal available from Europe's traditional supply areas. The excessive demand dumped on the United States, in addition to confirming that country's role as a potential balancing force between demand for and supply of coal, created, in the short term, no small problems of a logistic nature. It suffices to think that the lines waiting in United States ports amounted to 180-200 ships in November. Assuming an average wait of 60 days and demurrage at $15,000 a day for a typical ship with a deadweight tonnage of 45,000 tons, these delays are reflected in a increase in freight costs amounting to a good $20 a metric ton of coal.

Situations like the ones described may be regarded as quite abnormal in an adequately developed system operating under conditions of equilibrium, but they are not entirely unlikely. In fact, in comparison with oil, the coal cycle is relatively more complex. The number of different phases in the logistic chain is greater and the technical transfer times from one phase to the next tend to be much longer, with the result that the likelihood of impediment proves to be much greater. Generally, the problem can be solved by establishing a coal reserve at every transfer point sufficient for stopping up the random effects in such a way as to keep the risk within optimum limits of a cost and profits estimate. In the short term, however, when the system

is in full transition phase and especially when it is compelled to move rapidly, the maneuvering margins prove to be more restricted and especially adverse combinations of events are more likely to emerge.

The main problem pertains to the lack of an optimum agreement between the dimensions and the times characteristic of the infrastructures involved in the various phases of the chain. The importance of the scale factor in the future of ocean transportation of coal has been accepted everywhere fully and is reflected in the fact that the majority, if not all, of the new terminals built or planned today are specially equipped for taking colliers with dimensions certainly greater than 100,000-120,000 deadweight tonnage. Nevertheless, 15 to 20 years must pass before the ocean transportation fleet can be completely adapted to the characteristic scale of the new ports[3], creating in the meantime no small imbalances in the feasibility of port operations.

In this respect, the logistic problems that the very new port of Richards Bay, in the Republic of South Africa is experiencing, equipped to load ships up to 160,000 deadweight tons (250,000 deadweight tons in the 1985 outlook) but compelled, for the present, to receive ships with a much lower average deadweight tonnage, with considerable inefficiency and losses in management of the port activities. In periods of congestion -- now almost constant -- owing precisely to the below optimum size of most of the present ships, this port is often forced to defer loading ships with a capacity below 50,000 deadweight tons, in favor of larger ships more profitable from an economic point of view. In fact, smaller ships take up more room and require more time for every ton loaded, or else the occupy docks equipped for local transportation. All these factors are reflected in an increase in the lines at the entrance to the terminal and in a decline of productivity. In the outlook for the 1980's, it is likely that with the worldwide development of a fleet of large-capacity colliers (125,000 to 150,000 deadweight tons), better suited and economical for long-distance runs, ships with a smaller capacity (<80,000 deadweight tons) will frankly be completely excluded from this large export terminal and other similar ones that will be built in the meantime.

But even in importing countries difficulties and impediments in supply are beginning to appear in some cases owing to imbalances in the composition of the infrastructures. Waiting times in some Italian ports are often extended to over 4 days, and unloading time is added to this. Owing to an insufficiency of equipment, unloading time also ranges around 4 days, so that a ship with a deadweight tonnage of 40,000 tons may take, at present, up to 10 to 15 days in port for each round trip. These delays are especially reflected in the cost of imported coal, but also in the requirements of the sea transportation facilities. For example, a doubling of the port time for each round trip means an increase in their requirements of 20 percent, on the average.

It is not always a question, however, of inadequacy of the infrastructures, but also, in the particular Italian case, of organization of port labor, which should be adjusted to the problems characteristic of coal transportation in which work shifts around the clock, seven days a week, may be required. In order to illustrate the problems raised, take, for example, the cases recorded in 1980 of loads of coal that were compelled to seek other ports often by chance owing to an insufficiency of work shifts and also of the port infrastructures, with the result that, in addition to demurrage and added freight costs, the coal also underwent no small cost of transportation with delays that can be imagined.

It is obvious that chance solutions and makeshift means, as still seen in supplying coal in Italy, and also abroad, are inevitable during the first periods of rapid development of the infrastructure of the operational system. They cannot be tolerated, however, when the import level takes on considerable volume, if coal is to reach its destination regularly at acceptable costs.

Picture of the Intermediate Years

Steam coal consumption in Italy should increase about threefold between 1980 and 1985. The greater part of the increase (over 6 million metric tons a year) would have an effect as a result of the conversion of the bivalent ENEL powerplants to coal. A smaller part, but still consistent with the increase (about 5 million metric tons a year), can be regarded as practically certain on the basis of the coal conversion plans and the new sizable investments by cement works, a certain number of large industrial self-producers and various brick works. No contributions have been scheduled, on the other hand, by the new ENEL powerplants none of which, moreover, has the requisite authorizations yet.

The new map of coal import requirements would already be considerably changed with regard to 1980 (table 1). Under the assumption that the present authoritative restrictions limiting the maximum loading of coal allowed in the Vado Ligure and La Spezia powerplants to 50 percent, coal unloaded at these two ports might more than double with a saving of 1.5 million metric tons of oil a year. That would require, however, considerable action pertaining to an adequate development of the handling capacity of the unloading docks and of the storage areas. Moreover, in 1985 the Bridisi powerplant will also probably be completely converted to coal. With its four 320-megawatt generator sets it might consume 1.9 million metric tons of coal a year at full load. It is also very likely that at least part of the Milazzo powerplant may be converted to coal and in Sardinia another 240 megawatts will probably be added to coal in the Sulcis powerplant.

The most noteworthy changes concerning distribution of coal imports are, however, to be attributed to industrial consumption. The port of Savona should increase imports by 75 percent only to serve the northwestern area of the country and also perhaps doubling them, if the amounts unloaded subsequently in addition by sea are included. Civitavecchia, Bari, Ancona, Ravenna and Trieste are all ports indicated for serving the pertinent final consumption areas and which were practically not equipped in 1980 for importing coal. None of these ports, or other alternative ones, is intended for importing large amounts of coal for domestic distribution by 1985. Nevertheless, their adaptation should be started at least 2 years -- minimum technical time -- before the arrival of coal and that means starting practically immediately in 1981, in view of the anticipated acceleration in coal consumption in industrial use during the entire first half of the 1980's. On the whole, an increase in coal imports is anticipated from 0.6 million metric tons in 1980 to about 5.6 million metric tons in 1985, with a sustained increase amounting to 50 to 60 percent in each year of the period. If these amounts are to be distributed in the territory without undergoing high costs of land transportation, they will have to be unloaded close to the areas of final consumption.

The total steam coal requirement in 1985 will probably amount to 16 million metric tons, already representing 10 to 12 percent of the amounts that can be regarded as available in international trade on the basis of the present development programs of the exporting countries. If we assume a potential supply of 130 to 160 million

metric tons on the international market and a requirement ranging between 125 and 175 million metric tons a year[5], no serious tensions are anticipated on that account that might lead to supply problems and a price increase. The formula of the supply contract should still guarantee the country the amounts of coal that it needs and, moreover, the time available -- barely 4 years -- is now too short to put in effect other more reliable forms of participation in the new mining activities.

Table 1: Coal Consumption by Unloading Port* (10^3 tons)

	1979	1980	1985	1990
Vado Ligure	690	900	1850	1850
Savona	650	900	1560	3750
Genova (1)	135	350	450	1650
La Spezia	910	1150	2700	2700
Toscana (Piombino?) (2)				3900
Civitavecchia			535	830
Gioia Tauro				3700
Taranto				4100
Brindisi			1900	1900
Bari			200	300
Abruzzi (Vasto?)				3700
Ancona			395	570
Ravenna			300	600
Emilia Romagna (?)				2800
Fusina	970	960	1400	1400
Marghera	280	300	730	1050
Monfalcone	611	500	900	1500
Trieste			245	1550
Sicilia (Milazzo, (3) Palermo?)		25	855	5180
Sardegna (Porto Vesme, (4) Oristano?)	84	300	2380	4770
Italia (5)	4330	5385	16-10	47800

*The data given are final for 1979 and estimated for 1980. For 1985 and 1990, see footnote 4.
Key: 1. Genoa; 2. Tuscany; 3. Sicily; 4. Sardinia; 5. Italy

Although coal is available in the exporting countries, it is, however, not so clear that serious problems will not come up with regard to its transportation and importation in Italy. The problems of congestion in the export ports might worsen in this transition phase, still very dynamic, that characterizes the first half of the 1980's. Although, in fact, some ports like Richards Bay in the Republic of South Africa, Hay Point and Port Kembla in Australia and perhaps Galveston in the United States will be equipped for taking ships with 120,000 to 150,000 deadweight tonnage, and also others, actually the freight market will still be based extensively on ships with a capacity lower than 80,000 to 100,000 deadweight tons. In fact, in 1985, only 28 percent of the world fleet of dry cargo ships will have been built after 1980 and the average age of the fleet will be close to 10 years. Therefore, in the short term, it is possible that the imbalance between the dimensions of the port structures and the size of the ships will determine, under foreseeable flow conditions, a logistic limit on exports from South Africa and from Australia somewhat lower than the maximum potential of supply on the international market. The situation for smaller ships, with a capacity of 40,000 to 50.000 deadweight tons, will probably be still more problematical and these ships, which are already said to find it difficult to handle the long distances from Australia economically, will probably have to be excluded for reasons of congestion even by the South African suppliers.

The importance of the scale factor in speeding up loading operations in the export ports is never stressed enough. A typical ship with a capacity of 50,000 deadweight tons is 190 meters long, compared with 295 meters for a ship with a capacity of 150,000 deadweight tons. The length per 10^3 metric tons transported, which is a critically important factor in logistic operations inside ports, turns out to be 3.8 meters and, respectively, 2.0 meters, with a gain of a little less than 50 percent for ships with a capacity of 150,000 deadweight tons. The time taken for maneuvers in comparison with the total time of port operations increases considerably with a decrease in scale. Assuming a loading speed of 5,000 metric tons an hour, time for maneuvering and docking represents 50 percent of the total time for operations for a ship with a capacity of 50,000 deadweight tons, but only 25 percent for a ship with a capacity of 100,000 deadweight tons. Profitability of port operations is definitely dependent on the number of tons loaded. For example, loading 600,000 metric tons requires 12 ships with a capacity of 50,000 deadweight tons, but only four ships with a capacity of 150,000 deadweight tons. Under the above conditions, typical of a large port like Richards Bay, the actual total time for maneuvering, docking and loading can be estimated at 240 hours for ships with a capacity of 50,000 deadweight tons and at 160 hours for ships with a capacity of 150,000 deadweight tons with a 33-percent gain by the latter. An indication of the disturbance caused by undersized ships with regard to the port planning capability is given by the product of losses, or inefficiencies, with regard to the space and time factor illustrated above. In the case in question, the following is the profitability of port operations with regard to the use of ships with a capacity of 200,000 deadweight tons, regarded as the optimum size for long-distance runs:

Deadweight tonnage	
200,000	100
150,000	77
100,000	45
50,000	27
40,000	21

Another imbalance factor is found in the different optimum dimension of the export ports and of the final destination ports in the importing countries. In the first case, savings in scale suggest concentration of the export phase in a few large ports that tend to be planned for taking and loading large-sized ships, for reasons of logistic feasibility and greater economy in the transportation phase. In the second case, distribution of points of final consumption in the territory and the need for minimizing land transportation suggest import level in the individual ports measured with the actual requirements of the immediate hinterland. As is seen from table 1, in 1985 import levels greater than 3 million metric tons are not foreseeable for any port of final destination and even by 1990 the maximum import level practically does not exceed 5 million metric tons. Under these conditions, if it desired to make maximum use of port infrastructures for the purpose of making the pertinent investiments more profitable and of minimizing them at the same time, the optimum size for ships is never greater than 20,000 to 40,000 deadweight tons. In fact, it suffices to think that for unloading 5 million metric tons a year even recourse to ships with a capacity of 40,000 deadweight tons, requiring a port time certainly not greater than 36 hours, would use the port facilities only 50 percent of the time.

If the restriction of direct supply from the exporting country to the port of final destination is insisted on, the use of ships with a greater capacity (60,000 to 80,000 deadweight tons) would make it possible to recover part of these diseconomies through the greater economies in the transportation phase. Nevertheless, for the reasons already stated, it is doubtful that ships with a capacity of less than 80,000 to 100,000 deadweight tons will have easy going for long-distance runs from Australia and South Africa. In the assumption of this restriction, Italy should look more and more toward supply areas like Poland and the United States which, at least for now, do not seem to intend to establish deep-water superterminals for taking large colliers.

An increase in supply from Poland is to be regarded as difficult, however, because that country does not seem to intend to develop its coal exports appreciably in the 1980's, while pressure by the Scandinavian countries and North Europe seems to be constantly greater. In fact, the logistic problem does not come up only in the United States, where six landings for receiving colliers are under construction at present, also because of the shallow depths suitable for ships with a deadweight tonnage of 40,000 to 80,000.

It is, however, difficult for the United States to succeed in developing their steam coal exports beyond 25 million to 35 million metric tons a year by 1985, because of the limitations placed by development of domestic rail transportation. For the short term, moreover, United States coal often proves to be problematic for importation into Italy owing to current legislation that puts a 1-percent limit on the sulfur content burned in boilers. Nearly 80 percent of the coal produced at present in the United States has a sulfur content greater than 1.2 percent. With the development of mines in the western states, availability of coal with a low sulfur content should increase until it reaches 40 percent in 1985 and 45 percent in 1990. Nevertheless, the long distances of domestic transportation involved raise both logistic problems in the short term and also sustained added costs (on the order of $20 to $30 a metric ton). In addition, the market price will tend to be very high.

The imbalance between the characteristic dimensions in the exporting ports of the most promising supply areas for the short term (Australia and South Africa) and in the ports of final destination in Italy finds a technically and economically efficient solution in sorting terminals. The intermediate logistic phase of the terminal, in fact, makes it possible to separate from each other the various savings of the export and ocean transportation phase and of the import phase at the final destination. A terminal handling 10 to 20 million metric tons a year and over would make the economical utilization of large-sized ships possible on long-distance runs, a storage phase comparable with a mine of respectable dimensions and an economically and logistically quick interface with the transportation phase and local distribution.

The most economical and reliable strategy for Italy, as well as for other importing countries for transfrerring coal from the producing areas to the consuming areas is based, obviously, on recourse to large-sized colliers in the first half of the 1980's. For example, six ships with a capacity of 125,000 deadweight tons available between 1983 and 1985 would suffice for handling supply of 7 million metric tons a year from South Africa, minimizing the risk of congestion in the port of Richards Bay and also reducing the cost of sea transportation and importation by at least 40 percent in comparison with a ship with a deadweight tonnage of 50,000. Although those

large-sized ships might speed up the logistic phase of export and transportation and make it less expensive, they raise considerable problems with regard to arrival in Italy where the shallow water of most of the ports limits, in the short term, the receiving capacity, practically always to less than 40,000 deadweight tons (table 2). Because it takes 4 to 5 years to construct a terminal for importing coal, it is probably already too late to build one in Italy in time for the middle of the 1980's, unless the issue of Gioia Tauro, which offers all the best guarantees for a large coal terminal suitable for serving not only Italy but also the more vast area of the Mediterranean[6], is settled as soon as possible.

Table 2: Present Characteristics of Italian Public Docks Available for Unloading Colliers

	n. attracchi (1)	pescaggio (m) (2)	capacità massima (3) navi a pieno carico (tpl x 1000)
Savona	1	9.5	30
Genova (4)	1	10.5	40
La Spezia	1	10.5	25
Livorno	2	8 e 8.5	12
Civitavecchia	1	8.5	15
Napoli (5)	1	9.5	15
Gela	1	9.5	25/30
Palermo	1	11	25
Brindisi	1	8.5	15
Bari	1	9	15
Ancona	2	9	17
Ravenna	1	8.5	15
Venezia (6)	2	8.5	25
Trieste	2	9.5	30
Monfalcone	1	7.5	15
Porto Vesme	1	7.5	15
Cagliari	1	8	12

Source: Footnote 8, appendix 4.
Key: 1. number of docks; 2. depth in meters; 3. maximum capacity fully loaded ships (deadweight tonnage X 1000); 4. Genoa; 5. Naples; 6. Venice

Actually, it seems rather likely that the choice of the transportation chain will be import terminal with subsequent sorting and, moreover, it will prove to be an obligatory choice for Italy if for no other reason than because of the limitations that will apply to a normal logistic development of coal supply to Italy during the 1980's. In fact, today already, it is rather more economical and reliable to import coal from the port of Fos in France, which is capable of handling colliers with a capacity of 100,000 deadweight tons, as is shown by recourse to the use of large lighters that carry coal to Savona and to the Sulcis powerplant, in Sardinia, from Fos over a distance of about 300 kilometers. The principle is exactly the same as a terminal, even though the use of lighters instead of ships must probably be regarded as economical only in this transition phase, when the ports are not yet properly equipped. The lighters, in fact, do not require water depths greater than 6 to 7 meters. The fact that these developments are occurring through traditional market phenomena and not through explicit policy choices give support to the validity of the economic and technical logic of the sorting terminal as a solution to the problems raised by the transportation and importation of coal into Italy.

With regard to Fos, near Marseilles, port development programs have already been started that should increase its import capacity from 2 million metric tons a year to over 10 million metric tons a year by 1985, with the possibility of handling ships with a capacity of 150,000 to 200,000 deadweight tons. Nevertheless, it is still a question of very little in comparison with the steam coal requirement in the Mediterranean area during the 1980's. According to present plans, the countries depending on the Mediterranean for their coal supply (Austria, France, Greece, Italy, Spain, Switzerland, Yugoslavia) will probably require around 35 million metric tons in 1985 and about 75 million metric tons in 1990[7]. The requirement will probably be thus already much greater than the port of Fos can handle by itself. Therefore, the need is raised for identifying as soon as possible other ports to be used indispensably as terminals. Assuming that almost 50 percent of the requirement in the Mediterranean area in 1985 and over 60 percent in 1990 will probably be intended for Italy, a choice in this country would seem natural and almost obligatory.

The Goal of the 1980's

Steam coal consumption in Italy should increase by about three times also between 1985 and 1990. Distribution of the increase between consumption sectors is, however, quite different with regard to the preceding 5 years (table 3). In fact, while between 1980 and 1985 the increase is divided almost equally between the electricity sector and the other industrial uses, between 1985 and 1990 over 85 percent of the increase will probably be owing to electricity production. Moreover, within the other industrial uses, the first half of the decade is distinguished by a greater dynamism by the cement works, which are more sensitive to variations in the short term, while the second half will probably be distinguished by a greater increase in coal consumption by the large industrial self-producers.

Nevertheless, what more than anything divides the decade of the 1980's in two parts concerns the different nature of the contribution of coal in the electricity sector. In fact, up to 1985, only contributions owing to the conversion of bivalent powerpants on the basis of fuel oil are possible. The greatest innovation of the 1985-1990 period pertains, on the other hand, to the construction of new ENEL powerplants, while the contributions owing to conversion will rapidly be exhausted. The new power based on coal that should be installed and in operation by 1990 amounts to 18,200 megawatts. Of this, 1,280 megawatts pertain to additions of 640-megawatt sections to each of the Monfalcone and Chivasso powerplants. For the remaining 16,920 megawatts, present plans pertain to completely new locations for several regions of Italy:

Lombardy (Bastida Pancarana)	1,280 megawatts
Emilia Romagna	1,920 megawatts
Tuscany	2,560 megawatts
Abruzzi	2,560 megawatts
Puglie (Taranto?)	2,560 megawatts
Calabria (Gioia Tauro?)	2,560 megawatts
Sicily	1,880 megawatts
Sardinia	1,200 megawatts

Table 3: Steam Coal Consumption by Use Sector* (in million metric tons a year)

(1) anno	(2) energia elettrica	(3) altri usi industriali				Totale (7)
		cementifici (4)	laterifici (5)	autoproduttori (6) industriali	Totale (7)	
1980	4.7	0.7	–	–	0.7	5.4
1985	10.8	3.2	0.3	2.2	5.7	16.5
1990	38.0	4.6	0.5	4.7	9.8	47.8

* The data for 1980 are estimated. For the forecasts to 1985 and to 1990, see Footnote 4.

Key: 1. year; 2. electricity; 3. other industrial uses; 4. cement works; 5. brick works; 6. industrial self-producers; 7. total

Part of these new contributions of power should begin to go in operation already 3 or 4 years before the end of the decade. In the interest of an orderly, effective development of the sharp upsurge in coal supply for electric powerplants (~27 million metric tons a year between 1985 and 1990) it is, in fact, essential for the placing in operation of the new powerplants to be distributed over a time range as long as possible and not concentrated at the end of the last year or two of the period. Assuming a technical time of about 6 to 7 years for ordering and constructing, ENEL should provide itself with the authorizations for starting work in 1981 and not later than 1982-1983. In this connection, the first experience had with the location of coal-fired powerplants is causing concern, because it does not appear to be much easier than what happened in the nuclear field, judging from the fact that, at a distance of almost a year, the procedure started with the Regions, in accordance with Law 393, for location of sites for five of the new powerplants has not yet moved ahead in the slightest.

In view of the gravity of the environmental and social repercussions that might result in the prospects of strong development of coal, if insufficiently controlled, it is natural for the territorial coordination of the pertinent import, transportation and coal conversion infrastructure to require extensive negotiations between the central and local authorities. In this connection, in the interest of carrying out the coal strategy, a maximum effort of immagination and an opening and an endeavor much greater than what has been had in similar circumstances in the past are important. The debate that will emerge from the problem of location of the coal-fired powerplants will end by slowing down substantially recourse to this source, if it is not tackled with the full support of public opinion and of the experts in the sector. Therefore, it is still advisable to undertake as soon as possible every initiative (institutional, legislative, technological and organizational) indispensable for the success of the coal programs. In view of the short times involved, the environmental problem also is part of coal logistics in the 1980's[8].

Location and authorization to proceed are, in fact, the most critical points in the whole strategy. Excessive delays in this connection may be detrimental to the entire program of coal supply. The long technical times require immediately maximum trust by all the participants involved along the entire range of the coal cycle. Before starting today the long, costly authorization procedure for opening mines and for developing railroads and ports, the producing countries must have almost absolute certainty that within 7 to 9 years, at the end of the chain, their coal will

actually be used. Likewise, any vacillation by the consumer in setting up his plans may also seriously delay development of the fleet of long-distance colliers needed for rapid, efficient and economical transportation, therefore setting another obstacle to the supply of coal in Italy.

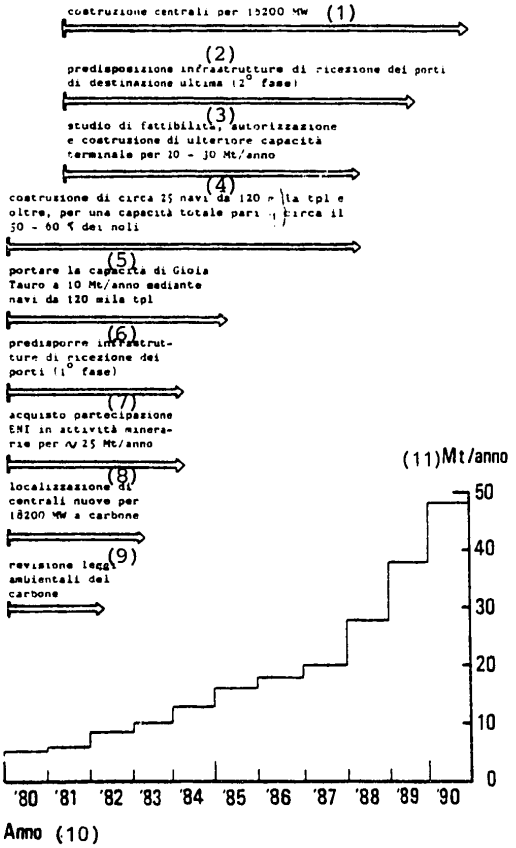
Moreover, the situation is aggravated by the possible imbalance between steam coal supply and demand in international commerce in the second half of the 1980's. The range of uncertainty of the import requirement on a worldwide basis in 1990 is, in fact, 230 to 320 million metric tons, while exports will find it difficult to exceed a level of 210 to 250 million metric tons and that only under the assumption that the producing countries are convinced of the actual existence of that kind of market in the next 2 or 3 years at most.[5] In view of this anticipation of tension in the steam coal market, it is pointed out that Italy by itself should definitely double its share in the exports from an already substantial 10-percent level in 1985 to 19 to 23 percent in 1990. This undertaking is to be regarded as difficult, unless exceptional efforts are started right now to guarantee itself at least half the coal needed in 1990 on the basis of agreements of participation in mining and infrastructure investments, and also in the activities themselves.

Admitted that Italy succeeds in guaranteeing for itself the requisite amount of coal, the problem of its transportation and importation must be solved and, because of the long technical times involved, this problem also has to be tackled with extreme urgency in all its parts. The map of imports changes rapidly during the 1980's, as is shown by table 1. What proves to be of most concern in all this dynamics, pertains to the construction of new ports requiring an increasing endeavor in time. If, in fact, 22 percent of the imports in 1985 are to arrive through ports not yet equipped in 1980 to receive coal, in 1990 38 percent of the imports are to arrive through ports that were not yet equipped in 1985. Overall, over 60 percent of the steam coal imports anticipated for 1990 will probably come through ports that were not yet equipped in 1980 and that often were not even identified. The technical time for construction of a port equipped for receiving coal should not normally exceed 2 to 3 years. Nevertheless, location of the new ports should be linked with location of the powerplants. This fact may possibly slow down one choice or the other, owing to the various jurisdictions and authorities involved.

Finally, there is the matter of the optimum characteristics and functions of the coal ports whose discussion may also lead to considerable delays, because it is based on a great variety of points of view. Therefore, it should be settled with maximum speed. It is difficult to justify supply with ships having a capacity of over 50,000 to 60,000 deadweight tons, unless most of the 20 and more ports that are to be equipped for imports function as terminals. In many cases, in view of the small amounts involved, it is even difficult to justify colliers with a capacity of over 25,000 deadweight tons. Reception of ships with a capacity of 100,000 to 125,000 deadweight tons would require an annual import level of at least 10 million metric tons for an economical utilization of the port infrastructures. On the other hand, as has already been discussed, it is not possible to ensure economical, reliable and regular supply with ships having a capacity of less than 100,000 to 125,000 deadweight tons. Therefore, it is necessary to discard port plans for receiving medium-sized colliers (~100,000 deadweight tons) that are not integrated in the sphere of a large-bulk terminal; in other words, a port area with a receiving capacity of at least 10 to 15 million metric tons a year for subsequent local consumption or shipment in small-capacity ships to other ports.

Once more, it should be stressed that the optimum concept is that of the large-bulk terminal making it possible to separate the two logistic phases of long-distance transportation and local transportation. All the importing countries, from Japan to the North European countries, are equipping themselves in this way for the simple fact that it proves to be the best system from both a technical and economic point of view. For Italy, this kind of solution would avoid many problems connected with the restructuring of port areas and of anchorages. It is, however, difficult to imagine how Italy could solve its problem of the import of large amounts of coal without having a large-bulk terminal on its own territory. In view of the fact that, in 1990, Italy will probably be absorbing about 60 to 70 percent of the supply affecting the Mediterranean, it should think right now about ensuring itself by 1990 of a terminal capacity suitable for the importation of at least 60 percent of the steam coal that it will need, for a total of about 30 to 35 million metric tons a year. In other words, two medium-sized terminals, or one very large one. In view of the fact that, because of the same reasoning, part of this capacity (~7 to 10 million metric tons a year) will probably be needed already by 1985, the choice of Gioia Tauro seems practically obligatory, because it is the only port capable, in the time available (~3 years), of being equipped for that importation level by means of colliers with a capacity of 100,000 to 125,000 deadweight tons.

Figure 1: Progress Table for the Coal Strategy in the 1980's



Key: 1. powerplant construction for 18,299 megawatts; 2. preparation of receiving infrastructure in final destination ports (2nds phase); 3. feasibility study, authorization and construction of subsequent terminal, capacity 20-30 million metric tons a year; 4. construction of about 25 ships with capacity of 120,000 deadwight tons and over, for a total capacity of about 50-50 percent of the freight; 5. bring capacity of Gioia Tauro to 10 million metric tons a year, by means of 120,000-deadweight-tonnage ships; 6. prepare port receiving infrastructure (1st phase); 7. acquisition of ENI [National Hydrocarbons Agency] participation in mining activity for ~25 million metric tons a year; 8. location of new coal-fired powerplants for 18,200 megawatts; 9. revision of environmental laws on coal; 10. year; 11. million metric tons a year

Critical Problems To Be Solved

Obviously, there is no master plan like the one shown in figure 1, agreed upon by all the participants involved in the coal cycle. Nevertheless, only by means of a progress table like the one proposed in figure 1 can there be hope of attaining a steam coal import level of 48 million metric tons a year in Italy by 1990. The decision-makers are many and they all have different interests. Although the desire to make extensive use of coal exists for most of the country's operators, there are, moreover, many differences of opinion whose resolution will very probably end by delaying the action to be taken and, therefore, make the strategy infeasible.

The critical problems to be solved are few but substantial. The first one pertains to environmental legislation and especially the matter of sulfur content. It will become more and more difficult to find coal with a low sulfur content, while there are technologies that, regardless of how expensive they may be, ensure considerable lowering of sulfur dioxide to levels much lower than those possible by means of using coal with less than 1 percent sulfur content. In some sectors, like cement, the process itself strictly cuts down all the sulfur by means of fixation. Therefore, a process of revision of environmental legislation should be initiated as soon as possible that will prove to be not only more permissive on the sulfur content in coal but, especially, much more strict on the quality of air. That would first of all facilitate the problem of location of the new powerplants by giving, therefore, a signal of trust to all the operators along the chain. In the second place, it would facilitate the ENI's work of supply, because its mining activity would no longer be tied to deposits with a low sulfur content.

The second big problem to be solved pertains to the ports. There are many different positions on this problem: the regions, local and port authorities, public operators and private operators. ENEL's position is still especially enigmatic. Against all technical, economic logic and reliability of supply, it is insisting on autonomy of importation and unloading, causing uncertainlty and incomprehension in all the operators in the sector. The logistic problem of transportation and importation is also complicated by the inconceivable prejudice against Gioia Tauro. This port, which is recognized by all to be in a very advantageous location as a terminal for supplying not only Italy but also other countries on the Mediterranean, is said to have the possibility of expanding much beyond the capacity of 10 million metric tons a year frequently mentioned. By using ships with a capacity of 150,000 to 200,000 deadweight tons, facilitated by the fact that the 20-meter curve lies only 300 meters from the coast, it might be possible to reach 30 to 40 million metric tons a year in the 1990's. This kind of import level would create direct and indirect employment for at least 3,000 workers.[9] It would solve a large part of the problem of coal importation in Italy and, finally, it would consolidate for Italy a first-rank role for this country in the international distribution of coal -- not inferior to the one in view for North Europe with the port of Rotterdam -- and with economic advantages not only to the South by also to the country as a whole.

Nevertheless, the real situation is in other terms. Little or no mention is made of the critical problem of the environment. The port policy is pursued in a disjointed manner outside a framework of overall coordination. The greatest endeavor seems to be concentrated on less critical problems, like technologies of the future, the matter of ashes, transportation of coal dust on highways, availability of railroad cars, without thinking that on a peninsula like Italy land transportation can

be minimized with an appropriate programing of supply by sea and with minimum modifications to a number of existing ports.[10]

The fact is that time is getting short. As is shown elsewhere,[11] the attainment of an import level of 48 million metric tons a year already by 2000 raises substantial difficulties. That does not mean that it is impossible to bring about that kind of level in the period of barely a decade and that, therefore, Italy is doomed to a future of economic and social depression. It means, however, a coordination of objectives, consistency in choices and perseverance in endeavor and action , which can be possible when the country as a whole is convinced of the real alternatives.

Milan, December 1980.

FOOTNOTES

1. U. Colombo, O. Bernardini, R. Galli and W. Mebane, "The WAES-Italy Report: The Strategic Alternatives for an Energy Policy," Franco Angeli, 1978.

2. The most usual forecasts on steam coal consumption on the order of 6.5 million metric tons in 1980 do not take into account the authorized restrictions limiting the maximum load permitted for coal in the Vado Ligure and La Spezia powerplants to 50 percent of the power.

3. MARITIME TRANSPORT, "World Coal Study," working paper, Odense Lindo, June 1979.

4. For the assumptions on distribution of the import requirement to 1985 and 1990, G. L. Chiavari, "Regional Consumption of Energy Coal in Italy 1980-1990," International Meetings on Energy, "Nuclear Energy and Coal Toward 2000," St. Vincent, November 1980, was followed.

5. These figures are based predominantly on the forecasts given in "Coal: Bridge to the Future" and "Future Coal Prospects, Country and Regional Assessments," REPORT OF THE WORLD COAL STUDY (WOCOL), Ballinger, 1980.

6. L. Baldassarri, "Large-bulk Terminal, Feasibility Study in Italy," Coe & Clerici, submitted to the meeting on "The Return to Coal," Fast, Milan, October 1980.

7. These estimates based on the WOCOL forecasts assume than 20 to 25 percent of France's import requirement are supplied through Mediterranean ports.

8. See O. Bernardini, M. Colitti, U. Colombo and E. Nardelli, "The Coal Stake: The WOCOL Study on the Prospects and Problems of Coal in Italy," Etas Libri, 1980, which provides an extensive survey of the environmental problem in Italy, in chapter 14.

9. See footnote 6 in which indirect employment by a terminal handling 10 million metric tons a year is estimated at 790 jobs.

10. Land transportation of amounts of coal relatively split up and distributed in the territory, like the amounts characteristic of the cement and brick sectors, does not constitute a logistic problem in itself. The shortage of railroad

cars, for example, which places serious limitations on the transportation of coal by rail, especially in the short term, is not a logistic problem but rather a price problem. The cost is about 30 percent lower for rail transportation compared with highway transportation. In fact, the supply of highway means of transportation far exceeds the demand for coal transportation, which, even in the 1990 projection, should not be greater than 10^9 ton-kilometers, around 1 percent of the present highway traffic of all freight. The same cannot be said for land transportation of large amounts of coal for concentrated consumption, as is true in the case of ENEL's powerplants. Under these conditions, there can be considerable logistic problems. See, for example, the analysis made in footnote 8 (chapter 13) pertaining to rail, river and canal transportation for inland electric powerplants. These problems have not been gone into, because they do not create great limitations on the development of coal in Italy, whose consumption can be concentrated near the sea.

11. See, for example, footnote 8 and especially chapter 15.

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CSO: 3104/218

END