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THE STRUCTURE OF ENERGY IN COMECON

Note by the Secretary

Included Corrig.
Rectif. Inclus

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The attached paper on the structure of energy in the COMECON countries, which has been prepared by the French Delegation, is hereby distributed to the members of the Sub-Committee for discussion at the next meeting.

(Signed) A. TANSEVER

OTAN/NATO,
Paris, (16e).

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INTRODUCTION

"The energy systems of the Socialist countries of Europe are merging. One of the major projects of our time - the complete unification of the energy systems of the European Socialist countries - is underway."

"Pravda", 19th August, 1963

1. In the case of the COMECON countries(1), the study of energy problems takes on a special aspect. We are considering an economic unit of a clearly defined type, namely an area run as a Socialist economy with central planning and practically self-sufficient to boot. A number of obstacles must be overcome for the energy requirements of countries in this area to be met. These include the widely dispersed sites of natural resources, the limits, absence or exhaustion of these resources in many countries, the difficulty of exploiting certain existing resources for technical or financial reasons.

2. In fact, the balance in this area is extremely uneven. On the one hand there is the USSR which, by the quantity and variety of its output, is the world's second largest producer of energy; on the other hand there are the satellite countries as a whole where there is a large gap. This unevenness produces a far from negligible drag on the economic growth of the area and moreover calls for close co-operation between the USSR and the other countries. The energy gap of the satellite countries is rendered all the more serious by the fact that it will probably increase as a result of the foreseeable changes in the pattern of the fuel balance. In effect, the energy sector is extremely sensitive to technological factors. Forms of energy considered essential at a given moment of industrial development are overtaken by other forms hitherto considered of secondary importance.

3. Even the definition of energy has changed over the past thirty years or so. What was formerly considered solely as a source of calories is now seen as the foundation of by-product industries; oil, gas and coal are not only fuels but also raw materials for widely differing chemical industries. These substitution phenomena lead to changes in the structure of the energy balance; they are particularly striking in the coal/oil relationship. There is already speculation on the type of changes which will be wrought by nuclear power.

(1) COMECON covers the USSR, Bulgaria, Hungary, the Soviet Occupied Zone of Germany, Poland, Rumania, Czechoslovakia, Albania and Outer Mongolia. The last mentioned has not been included in the present study owing to its negligible importance in the field of interest to us. It was thought advisable, however, to include Yugoslavia given the strengthening of ties between that country and COMECON since 1964

4. It is therefore easy to understand the importance attached by COMECON to finding a solution to the difficult problem of energy. The following analysis of this problem is divided into three parts: production and consumption, imports and exports, medium-term prospects.

I. THE ENERGY POTENTIAL OF COMECON(1)

A. Global resources (tables 1 and 2 at Annex).

5. An overall view of primary energy output in the COMECON countries(2) shows that:

- overall COMECON production rose by 5% in 1961, 6% in 1962 and 7% in 1963;
- output in countries of the Bloc other than the USSR is relatively stagnant: 4% per annum between 1961 and 1963;
- the USSR accounts for a considerable share of total production: 70.9% in 1963. This share is growing since in 1955 it only amounted to 64.2%.

6. However, the impression created by table 1 needs to be rectified by weighting the different percentages. A calculation has consequently been made of the relationship, in 1963, between the production of primary power and the size of the working population. This has made it possible to classify the different countries according to their actual contribution to overall energy production. The classification is as follows:

Soviet Occupied Zone of Germany	9.7
Czechoslovakia	3.7
USSR	7.1
Poland	7.0
Rumania	3.8
Hungary	3.7
Bulgaria	3.2
Yugoslavia	2.1
Albania	1.5

-
- (1) 1963 is the last year for which relatively comparable statistical data are available
(2) To which Yugoslavia has been added

7. Three groups of countries clearly emerge: those with a high energy production factor (Soviet Occupied Zone of Germany, Czechoslovakia, USSR and Poland), those with an average production factor (Rumania, Hungary and Bulgaria), and those with a low factor (Yugoslavia and Albania). It is interesting to note, for purposes of comparison, that the United States, with a working population of 75.7 million, produces 1,581 million MT/SF(1) of primary power, making a ratio of 22.4. (France, with a ratio of 4, is among the low factor countries).

B. Breakdown by product (tables 3 and 9)

1. Coal

8. The breakdown of energy output by product shows that COMECON is above all a coal producing unit: over a milliard tons (of both hard coal and lignite) in 1963. The output of the EEC countries for the same year was only 332 million tons of coal and lignite(2). However, COMECON coal output is only rising slowly: 8% between 1960 and 1963.

2. Coke (table 4)

9. The USSR leads the world in the production of smelting coke, outstripping the United States and Western Germany in this field. Satellite output only accounts for a quarter of the total output of the Bloc. This is because a considerable proportion of coal mined in these countries is of poor quality which is unsuitable for coke. Compared with the 84 million tons produced by COMECON in 1963, the EEC produced 71 million tons. The growth rate of Bloc output is fairly low: approximately 4% per annum.

3. Oil (table 5)

10. Oil production rose by 37% in three years, mainly as a result of output from Russian wells. The production of 223 million tons in 1963 for the Bloc as a whole was, however, lower than American production (372 million tons).

4. Petroleum products (table 6)

11. The production of petroleum products is directly related to this increase and is rising by some 10% per year. Comparison with the United States is distinctly unfavourable, since total output for the Bloc is no more than one half of United States output with the satellites only producing 15% of this total.

5. Electricity (table 7)

12. Production of electrical energy, which totalled 568 milliard Kw/h, fell far short of requirements, particularly in the satellite countries, where it is nevertheless rising rapidly (36% in three years) and accounting for an ever increasing share of the total.

(1) MT/SF: Metric tons of standard fuel: a metric ton of standard fuel has a calorific value of 7 million kilocalories

(2) For the record, it should be mentioned that the NATO countries produced 933 million tons in 1963

6. Gas (table 3)

13. Progress in gas output has been the most spectacular: 85% in three years. The importance of this new source of energy is destined to increase very rapidly. Thus, in 1962, natural gas in the USSR accounted for 10.5% of total energy output. According to the development plan, this share should increase to 20% in 1970. For purposes of comparison, the EEC produced 13.5 milliard cubic meters of gas in 1963 as compared with 107.4 milliard cubic meters in the COMECON countries.

14. In measuring the relative importance of the different sources of energy, reference may usefully be made to Soviet output forecasts: in 1965, coal accounted for 40.4% of total production, oil 35%, gas 15.2% and hydro-electricity 4.3%. In 1970, coal will only account for 32.7%, whereas oil will constitute 37.2%, gas 21.2% and hydro-electricity 5%(1). This demotion of coal, which is characteristic of economic growth, is also significantly noticeable in the EEC countries: in 1954, coal accounted for 67% of overall consumption in the Community, hydraulic power for 9% and oil and gas 24%. In 1964 it only represented 44% of total consumption, with electricity covering 6% and oil and gas 50% of power requirements.

0. Geographical breakdown of power resources.

15. The immediate impression gained from examination of tables 3 to 8 (illustrated by graphs 9 to 13) is of Soviet supremacy in the production of primary power. This impression should, however be corrected by the establishment of ratios which modify, sometimes very considerably, the structural relations between countries.

(1) In the case of coal, calculation of the ratio between the production of coal and lignite and the total number of inhabitants gives the following classification:

Soviet Occupied Zone of Germany	15
Czechoslovakia	7.1
Poland	4.2
Hungary	3
Bulgaria	2.6
USSR	2.4
Yugoslavia	1.5
Rumania	0.5

This classification should be weighted again to take account of the quality of the coal produced. The Soviet Occupied Zone of Germany, for example, owes its leading place to its high production of lignite (35% of world output). Coal, on the other hand, creates a serious problem since it had to import 18 million tons of this commodity in 1964. It may however be possible to correct this

(1) The consequences of this change in the balance of energy will be drawn in Part III of this paper (cf. page 19)

imbalance by the discovery of a process permitting coke for steel production to be manufactured from lignite.

(2) In the case of oil, the graph gives an accurate picture of actual production ratios (subject to an adjustment for Albania where production is surplus to requirements). The COMMECON countries may this be divided into three groups:

- USSR: where oil output is increasing steadily and is more than sufficient to meet the country's requirements; the Soviet oil balance (production less consumption) showed a surplus of 12.2 million tons in 1965. In 1963 this surplus had reached 60.3 million tons and the development plan provided for a 72 million ton surplus in 1965.
- Satellite countries with surplus production: Albania (which exported 450,000 tons in 1962) and Rumania (6 million tons exported in 1962).
- Satellite countries with production shortfalls: Bulgaria, Czechoslovakia, Hungary, Poland and Yugoslavia where the gap is constantly increasing.

(3) The discrepancies with regard to gas are even more significant: two countries produce more than they need, the USSR and Rumania; the other COMECON countries show a deficit. It is extremely difficult here to calculate requirements which are essentially potential. It may be anticipated that Hungary will be able to cover its requirements in the near future following the discovery of a large gas field in the region of Hajduszoboszlo. The other countries will have to import gas from the Soviet Union unless there is a fundamental change in the pattern of their natural resources(1).

(4) Production of electricity is dependent on hydraulic resources and on coal - and even on gas (Hungary) and oil (Rumania). With production at one tenth of Soviet output, the Soviet Occupied Zone of Germany is the only country with surplus electrical power, the consequence of its large scale production of lignite which is used in the thermal power stations.

16. Nuclear energy is driving a few power stations in the USSR. Many projects are in hand and power stations are being built both in the USSR and in the satellite countries. Production for the present is marginal.

(1) the Droujba gas pipe-line, which will follow the oil pipe-line, is now under construction. It is anticipated that it will supply the satellite countries with one milliard cubic metres per year as from 1967.

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D. Unevenness of distribution

17. In tables 3 to 8, an attempt has been made to show the shortfalls in energy for 1963 by comparing production with consumption. The consumption shown here is apparent internal consumption, obtained by adding import to internal production figures and subtracting exports. The figures are approximate owing to the fact that imports of given countries rarely tally with the figures provided by the exporting country, either because the method of accounting is different or because no allowance is made for re-exports or compensated exchanges of energy. The general balance is obtained by calculating the difference between production and consumption and gives a rough idea of the energy situation in a given country.

18. From the overall viewpoint, comparison between table 1 (total production of primary energy) and table 14 (per capita consumption of energy) shows that, while production in the satellite countries has increased at a yearly rate of 4%, average per capita consumption between 1961 and 1962 rose by 6.4%. In contrast, the 5% increase in consumption in the USSR was more than covered by a 7% increase in production. These differences provide a perfect illustration of the energy problem of the COMECON countries: on the one hand stands the USSR with a surplus of primary energy and, on the other, the remaining members of the Council with a growing deficit of this form of energy.

19. In the case of oil, for example, the growth of the gap is quite remarkable; between 1956 and 1962, oil production in satellite countries grew by only 2% per annum whereas during the same period, requirements rose by 10% per annum. In contrast, Soviet oil production is growing faster than internal consumption (which is nevertheless rising at the rate of 11.6% per annum). This widening gap may be illustrated by yet another set of figures: in 1956, satellite oil production amounted to 8% of Russian production. In 1965 it represented only 7%, and it is anticipated that this figure will fall to 5% in 1970.

20. The breakdown of these differences by product and by country produces the following table which shows that only the USSR has a surplus in each product:

Country	short of					
	coal & lignite	coke	crude oil	petroleum products	electricity	gas (2)
Albania		X				
Bulgaria	X	X	X(1)	X	X	
Czechoslovakia	X		X	X	X	X
Soviet occupied Zone of Germany	X	X	X			
Hungary		X	X	X	X	X(1)
Poland			X	X	X	X
Rumania	X	X			X	
USSR						
Yougoslavia	X	X	X	X		

- (1) This was the position in 1963. Since then, new oilfields have been opened up in Bulgaria and Hungary will soon be self-supporting in gas.
- (2) These are the only countries to which gas is piped.

21. To remedy these shortages of energy, the satellite countries have tried to find new sources or to step-up output from existing sources. While these efforts have met with some measure of success in Bulgaria and in Hungary, the results achieved have been manifestly insufficient to meet the growing demand. Although planned research and prospection can undoubtedly have repercussions on the present pattern of certain balances of energy (it is planned to exploit a rich oilfield in Poland), the urgent requirements of the satellite countries are forcing them to import from the USSR the forms of energy which are essential to their industrial development. In the majority of countries, the use of energy is the subject of stringent economy measures. In Bulgaria, a nation-wide competition has been launched to achieve savings in energy and in fuels. "If a saving of 3% on forecast energy and fuel consumption for 1965 could be achieved," stated the energy committee "a saving of 15,000,000 leva could be made and

supplementary production to the value of 300,000,000 leva obtained." The Czechoslovakian Minister of Fuel has also stressed the need for maximum economy of energy. However, whatever the increase in productivity and the probability of finding new sources of energy, the satellite countries now and for a long time to come will have to depend on external-i.e. Soviet resources.

II. EXCHANGES OF ENERGY BETWEEN THE COMECON COUNTRIES

A. Volume of exchanges

22. Two types of tables were devised for the study of exchanges between COMECON countries: on the one hand a series of diagrams with arrows clearly showing the direction of the exchanges between countries for each product (tables 16 - 21) and on the other hand a series of double entry tables (22 - 27) in which import figures for the different countries are shown on the horizontal lines. Imports from the Bloc, total imports and the ratio of imports to consumption appear at the end of the line. The final figures indicate the dependance of each country on other countries. Country by country exports, total exports to the Bloc and overall exports are shown in the columns.

23. The arrow diagrams speak for themselves. The part played by the USSR in inter-COMECON exchange is obvious. This part will become even greater once the DROUJBA gas pipeline has been completed (scheduled for 1967) and the electrical network has been extended.

24. It is interesting to work out, from tables 22 - 27, the extent to which the satellite countries are dependent on the outside world.

(i) In the case of coal, the dependance is slight, since the ratio between consumption and imports oscillates between 1.4% and 8% according to the country. The Soviet share of imports is not dominant either in Hungary or in Rumania.

(ii) The position as regards crude oil exchanges is very different. Supplies from the USSR reach all countries except Rumania and Albania which are themselves exporting countries(1). Imports account for a very high proportion of consumption: 98% in the case of the Soviet Occupied Zone of Germany, 95% in the case of Czechoslovakia, etc., and the Soviet share of these imports is often 100%.

(1) Rumania exports about 50% of its output, mainly in the form of petroleum products, the greater part of it towards countries which are not members of COMECON.

(iii) Exchanges of electricity follow yet another pattern. Supplies from the USSR are directed towards Czechoslovakia and Poland from where they are distributed to other countries which also exchange current between themselves. The special structure of the electrical system is studied further on in this paper (c.f. paragraph on the Prague distribution centre)(1). Imports of electricity are still low. The largest customer is Hungary with an import/consumption ratio of 10%.

25. It is necessary, at this point, to emphasise that COMECON energy requirements and the different aspects of dependence on outside sources must be seen in perspective. In effect, as has already been stated, many of these requirements are potential in that the satellite countries, unable to obtain certain products, are continuing to use low-yield sources of energy. It may consequently be concluded that potential demand for gas and electricity is extremely high, but that it cannot take concrete shape for lack of suitable infrastructure. We come in this way to the problem of substitute forms of energy which should, sooner or later, have considerable repercussions on the dependence of the satellite countries on outside supplies, which will in fact increase.

B. Methods of exchange

26. There have been two major phases in the development of these exchanges.

(i) During the period which ended in 1956-1957, the USSR systematically exploited the energy resources of the satellite countries, paying very low prices for coal from Poland and for Rumanian oil. At that time, it was an importer of energy.

(ii) From 1957 onwards, the agreements between the USSR and the satellite countries were revised and became less unfavourable to the supplying countries. The growth of satellite requirements and the improvement in energy production in the USSR completely altered the pattern of exchanges, so much so that the Soviet Union became an exporting country and began to remedy the energy short-fall of its partners. This increase of two-way traffic between the USSR and the satellites and the need for closer co-operation between the member countries of COMECON led to the creation of an "energy pool" which will be discussed here from three angles: legal, economical and financial.

(1) The system centred on Prague, which has been operating since 1963, will probably be supplemented by further connections (projected connection of the Bulgarian system to the USSR through Rumania).

(1) Legal Aspects

27. It is inevitable to think here of the ECSC which also planned to promote specialisation, rationalisation and the growth of exchanges of coal. As in the West, energy products are the ones which, in the East, best lend themselves to specialisation since they are tied to natural resources. Co-operation is all the more necessary in view of the fact that growing requirements cannot be covered from national resources in the majority of COMECON countries.

28. In practical terms, this striving for specialisation and co-operation was reflected by the creation within COMECON of specialised commissions such as:

- the standing commission on the coal industry;
- the standing commission on the oil and gas industries;
- the standing commission on electrical energy;
- the standing commission on the peaceful utilisation of atomic energy.

29. These commissions have broad Terms of Reference:

- the co-ordination of development planning in the energy industries, assessment of the consumption of the different fuels and of the levels of production needed to meet these requirements, studies on greater productivity, means of lowering the cost price, etc.;
- joint studies for the improvement of techniques and the reconversion, where necessary, of certain uneconomic workings;
- application of the decisions taken by the Executive Committee of COMECON (particularly as regards the substitution of fuels and exchanges between member countries).

30. Delegates to the XIXth Session of the Executive Committee, which met in Moscow on 21st September, 1965, complained that this co-operation was still inadequate although becoming increasingly necessary. Y. SOVENKO, a Soviet expert on the standing commission on electrical energy emphasised that "the merging of energy systems was permitting the Socialist countries of Eastern Europe to help one another meet their growing requirements for electricity and was making a marked contribution to the efficiency of electricity supplies for the national economies, besides allowing all countries to reap the benefits of a common effort: assistance in the case of technical difficulties, reduction of the power plant required in the generating stations because of staggered peak periods, mutual and beneficial employment of temporarily idle capacity, savings on investments as a result of a common energy pool, etc."

31. Savings achieved by the merger of energy systems should total at least 60 million roubles in 1965. The different methods of co-operation between COMECON countries are sanctioned by a series of agreements; some are of a purely commercial nature (covering deliveries of coke, hard coal, etc.) and others have far wider economic implications since they provide for a truly common energy infrastructure.

(2) Economic Aspects

32. This common energy infrastructure is of considerable economic importance in that it allows more rapid national economic development both by its primary effects (possibility of using existing productive capacity to the full) and by its secondary (creation of related industries) and tertiary (new prospects for exports, in particular) effects. Two common achievements, the "DROUJBA" exchange system for oil and gas and the Prague distribution centre, will be examined here in more detail.

(a) The DROUJBA system

33. To make good their growing oil deficit, the COMECON countries (cf. Part I) rely chiefly on imports from the USSR. The trend of these imports (oil and petroleum products) speaks for itself:

3 million tons in 1956
13.3 million tons in 1963
19.5 million tons forecast for 1965(1)
35 million tons forecast for 1970.

34. This situation called for the creation of an oil distribution system within COMECON. Since rail transport is impractical and costly and adds considerably to the burden on the rail system, the Soviet Union, the Soviet Occupied Zone of Germany, Poland, Czechoslovakia and Hungary signed an agreement in 1958 which provided for the construction of a 3,840 km. pipeline serving those countries(2). The DROUJBA pipeline met a number of requirements:

- to make good the oil deficit of the satellite countries;
- to cut transport costs;
- to prepare for the possible marketing of oil from Eastern Europe to Western Europe;
- to promote the creation of a chemical industry in the Communist world.

(1) Including 6 million tons for Czechoslovakia, about 5 million tons for the Soviet Occupied Zone of Germany, 4 million tons for Poland, 3 million tons for Hungary.

(2) On 1st January, 1965, this pipeline with its branch lines covered 5,115 km.

35. The economic importance of this pipeline is thus considerable since it leads to the creation (or expansion) of industries:

- along the route: manufacture of pipe and construction of pumping stations;
- at the terminals: construction of large refineries in countries served by the pipeline and of factories for the processing of by-products.

This pipeline will be matched in 1967 by a gas supply line which will eventually carry one milliard cu.m. of gas per annum. The member countries of COMECON will thus have access to energy supplies at reduced prices and with a high calorific content which will enable them to switch profitably from one form to another.

(b) Central organization at Prague for the distribution of electrical energy

36. It is generally estimated that consumption of electrical energy in industrial countries rises by 7% per annum or, in other words, doubles in ten years. In the COMECON countries, the even faster growth of requirements(1) called for the creation of machinery for the distribution of current between the different members.

37. A centre for the co-ordination of the energy systems of Czechoslovakia, the Soviet Union, Poland, Hungary and the Soviet Occupied Zone of Germany came into operation in Prague on 1st January, 1963. This dispatching centre provides the means of distributing current according to the requirements of each member of the organization (Rumania and Bulgaria became members in 1964).

38. As soon as it became operational, the dispatching enabled current from Hungary and the Ukraine to be sent to Poland and the Soviet Occupied Zone of Germany whose generating capacity had been affected by the hard winter. At the end of January, Polish and Hungarian power stations came to the aid of Czechoslovakia. This centralisation of electricity, as pointed out by Y. SOVENKO, permits the use of all surplus energy available at a given moment in a member country by others which are in short supply at that moment, particularly as a result of the differences in local time. Supplies, purchases and exchanges are based on bilateral contracts which may be either short or long-term. For example, Czechoslovakia and Rumania have a twenty year contract. Little is known about the terms of these contract,, particularly their financial aspect. The Prague centre controls the supply of energy, exchanges, prices etc.

(1) In Rumania, for example, consumption of electrical energy rose by 104% between 1959 and 1964. Between 1963 and 1964 imports rose by 62%.

39. A further example of co-operation in the field of energy is the current construction of the Iron Gates dam by Yugoslavia and Rumania. The hydro-electric station will generate 10 milliard Kw/hour per annum and cost \$400,000,000. The construction plant is said to be supplied by the USSR. The work is apparently financed by the Soviet Union, Yugoslavia and Rumania; Austria may be participating indirectly. Implementation of this project is currently hampered by financial difficulties following the refusal of the International Reconstruction and Development Bank and the Danube Commission to grant loans. Rumania and Yugoslavia have stated that they will fund the whole operation if no outside loans are forthcoming.

(3) Financial Aspects

40. In the case of the Iron Gates, the Rumanian-Yugoslav statement must be measured against the facts; the volume of investment needed is far too high to be met by those two countries. It therefore appears that the USSR will have to be responsible for the supply of both equipment and capital. The arrival of Russian technicians on the site would tend to confirm this assumption. It is unfortunately difficult to specify the extent to which each country contributes financially to joint projects. In the case of DROUJBA, there can be no doubt that the construction of the pipeline called for considerable investment most of which came from the Soviet Union. The figures are not, however, available.

41. All that is known is that the plant supplied by the USSR will be reimbursed in part by an increase in the price of oil which is already substantially higher in the COMECON countries than in the West(1). A very approximate indication is supplied by the following table of export prices for Soviet crude oil in 1962.

The cost per barrel (1 metric ton = 7.3 barrels) was:

\$1.51 to France
\$1.30 to Italy
\$1.49 to Ouba
\$3.10 to Czechoslovakia
\$2.66 to the Soviet Occupied Zone of Germany
\$3.03 to Hungary
\$3.10 to Poland

(1) According to certain sources, the high price, which probably covers the cost of depreciation, will be payable indefinitely.

42. This range of prices, which was already considerable before the opening of the DROUJBA pipeline, has become even greater. It may be explained in a number of ways. Amortisation of the plant probably accounts for a far from negligible portion of the price but there is also the question of the economic strategy practised by the USSR in selling cheaply to make headway on strongly competitive markets. The low price paid by Italy is significant. In contrast, there are the advantages derived by the Soviet Union from its near monopoly vis-à-vis its COMECON partners. However, before concluding that the satellite countries are being exploited by the USSR, account should be taken of various factors which to some extent justify these tariffs, well above world rates though they are:

- deliveries of Soviet oil are payable in Bloc currencies which is a considerable advantage to countries with low convertible currency reserves;
- importers are guaranteed steady supplies which are not affected by political or strategic uncertainties;
- to the amortisation of the pipeline proper must probably be added certain facilities granted by the USSR for the creation of petro-chemical plant, etc.

In short, it is often hazardous to compare prices between systems with fundamentally different structures, one of which, practically self-sufficient, fixes its prices on the basis of standards which have little in common with market mechanisms.

43. Apart from the Soviet financial contribution, the satellite countries have entered into mutual financial agreements the terms of which are worth examining. An example is the agreement reached between the Soviet Occupied Zone of Germany and Poland in 1961 for the construction of the Polish section of the DROUJBA pipeline: the former granted Poland a 57.8 million rouble loan bearing interest at 1.5% per annum. Both capital and interest were to be deducted in the decade following the opening of the pipeline from the charges payable by the Soviet Occupied Zone of Germany to Poland for the transit of Soviet oil. Likewise, the Soviet Occupied Zone of Germany loaned Poland, for the operation of the lignite mines, 400,000,000 roubles repayable after six years in the form of coal and electrical energy. The rates of interest, the terms for the reimbursement of loans, the calculation of investments and the possible rôle of the COMECON bank in providing plant for energy production cannot be examined here for lack of information.

C. Energy from extra-COMECON sources

44. Diagrams 16 to 21 are affected to some extent by a number of exports from and imports to the Bloc. The USSR has built up a substantial trade with non-Communist countries. In 1963, exports to countries outside the Bloc amounted to:

coal: 46% of total exports
coke: 22% of total exports
oil(1): 62% of total exports
petroleum products(1): 77% of total exports

45. In 1965, exports of Soviet oil to non-Communist countries, particularly to Switzerland, Japan and the Argentine, were mounting rapidly. Exports in the first half of 1965 increased by 11%, whereas the rate of growth in 1963 and 1964 had been only 8% and 9% respectively. Mention should be made here of Finland, which obtains practically all its oil imports from the Soviet Union, Iceland, which has entered into a long-term oil agreement with the USSR, and Italy which, through the ENI, tried to break the international oil cartel by large-scale imports from the USSR. By 1970, oil exports to countries outside the Bloc should reach the 77 million ton mark.

46. Rumania and Yugoslavia are trading fairly extensively with the West. Poland exports mainly coal and coke. The recent agreements with France should boost these exports even further.

47. East-West trade may however create a problem in that the COMECON countries may be tempted to increase their exports to the West at the expense of countries in short supply of energy in order to obtain convertible currencies. The example of the Soviet Occupied Zone of Germany, which imports Russian oil, processes it and re-exports the products obtained to the Federal Republic of Germany, is a case in point.

III. PROBLEMS AND PROSPECTS

A. Trend of the energy gap

48. The Executive Committee of COMECON at its XIXth session (21st September, 1965), after giving out the forecast rates of growth for 1966-1970 which were to make good existing economic deficits and allow time to be gained in the competition with capitalism, stressed the need to build up the energy balance, to find the best way of meeting requirements in this field and to help certain countries overcome difficulties which were due to their limited resources (cf. table 30).

(1) cf. Table 28

49. The Soviet energy balance for 1965 and 1970 (table 29) shows a steady structural improvement, particularly through the gradual replacement of coal by oil and as a result of the increasing share of natural gas in consumption.

50. Between 1962 and 1965, apparent trade in energy rose by 43%. It is anticipated that for 1965-1970 the increase will be 63% and it may be assumed that this will mainly benefit the satellite countries whose gap will only close very gradually.

51. The study of the future trend of this gap was discussed at length at the XIXth session of the Executive Committee of COMECON. It seems likely that some of the bottlenecks will continue. The Polish Rapporteur, Mr. Mitrega, was of the opinion that all the coal requirements of member countries could, in principle, be met by 1970, but that difficulties might be encountered for certain qualities of coal(1). He thought that coal would remain the basic source of energy for the COMECON countries during the next five years. These countries would, in principle, need to step up their imports(2). As for gas and oil, the relevant commission showed that increased investment in the development of basic energy made it possible to forecast a considerable increase in reserves and in the production of oil and gas, but that even so this would not be sufficient to cover requirements which were rising fast. Oil refining has developed rapidly as a result of large-scale imports from the Soviet Union. "We consider these deliveries to be a basic contribution to the economic development of the members of our organization" said Mr. Fidelski, the Polish Representative.

52. The improvement of the energy balance is also dependent on electrification; according to preliminary estimates, the COMECON countries will generate 3,500 milliard Kw/h., i.e. one and a half times world output in 1962.

53. The energy pattern in 1970 will obviously vary considerably from country to country. It is to be feared, moreover, that the gap between countries with large natural resources and those which are less fortunate in this sphere will become wider as a result of uneven development. Bulgaria, for example, despite remarkable results in the production of

-
- (1) This is the case of the Soviet Occupied Zone of Germany whose requirements for coking coal are increasing rapidly.
(2) Not without difficulty since Poland is trying to push her sales to the West.

energy(1) will have a big gap and will have to import 40% of its energy in 1970 as compared with 15% in 1960. Forecasts for the different COMECON countries show that imports of oil will rise:

Czechoslovakia	:	9.6 million tons in 1970
Soviet Occupied Zone of Germany	:	7.8 million tons in 1970
Hungary	:	4 million tons in 1970
Poland	:	8.5 million tons in 1970

The situation as regards Rumania is uncertain since its oil reserves are estimated at only 150 million tons, just enough to meet its requirements (including exports) for the next twelve years. It is, however, possible that natural gas may provide a substitute source of energy.

54. A study of development plans gives some indication of these shortfalls to the extent that all the COMECON countries are placing emphasis on the development of the chemical industry. In Czechoslovakia for example, the share of the chemical industry in total industrial output is only 7% while in the United States it is 13.8% and in France 19.1%. In Bulgaria, the opening of the Bourgas refinery should give petro-chemistry a leading place in industry.

55. On the basis of these data, it is therefore, possible to establish a pattern for the next decade. All other things being equal, and to develop their economies and narrow the gap separating them from the industrialised countries of the non-Communist world, the COMECON countries will have to make a major effort, particularly as regards the chemical industries. Energy requirements will more than keep step with industrial development (particularly as a result of low productivity and the incomplete use of products). Geographically, politically and economically, it is natural that these growing requirements should be covered by the USSR which has sufficient energy potential to meet them and which, in providing a market for the production of member countries, enables them to pay for their oil or gas.

(1) Per capita output of electrical energy rose from 600 Kw/h. in 1960 to 1,070 Kw/h. in 1970. Between 1964 and 1970 coal output should rise by 82% and electricity by 200%.

B. Dependence on the USSR

56. The dependence of the satellite countries on the USSR for their energy creates a certain amount of political dependence. Much is being said at present about "centrifugal tendencies" in COMECON. The mere fact that most of the satellites have based their planning on the assumption of a steady increase in energy supplies from the USSR must seriously limit the scope of aspirations to autonomy. It is easy to imagine the consequences for Czechoslovakia or Hungary of the suspension of oil supplies. This situation undoubtedly affords a far from negligible means of applying pressure and it may well be asked whether Rumania's inclination towards independence may not be due in part to the fact that it produces more energy than it needs.

57. This dependence must, however, be seen in a larger context. The USSR also supplies the satellite countries with a large proportion of their raw materials and has a near-monopoly in the purchase of goods manufactured by them. Emphasis must therefore be laid on the integration, linked to the complementary nature of the economies, which this dependence must promote. To some extent, the DROUJBA pipeline may be considered as a basic factor in the creation of a true area of economic co-operation. This co-operation, judging from criticisms made at the XIXth Session, is still far from adequate and needs to be extended in several directions such as the co-ordination of planning, multilateral financial aid and technical assistance leading to the joint development of energy and mining resources.

58. At present, this co-operation seems to exist on a bilateral rather than a multilateral basis, mainly because of national feeling. It may be assumed, however, that the development of joint efforts in the field of energy will be the keystone to the truly multilateral economic organization of COMECON.

C. Burden on the USSR

59. A final point to be considered is the burden placed on the USSR by growing exports of energy to the satellite countries, as well as by assistance given for the construction of pipelines, the development of natural resources, etc. Dependence, in fact, works both ways: having accepted responsibility for the power requirements of the satellites, the Soviet Union would find it difficult to reduce its deliveries or refuse its aid in the development of satellite potential. Contingent difficulties may make this burden a heavy one at times: the need to produce pipe in 1963 may have temporarily held back the development of certain industries. In addition, since 1964, a sharp imbalance has appeared in the USSR between the Eastern regions with their surplus output and European regions where high internal demand has been accentuated by deliveries to the satellite countries (cf. Kosygin's speech).

60. It may well also be wondered whether the freedom of action of Soviet exporters is not affected by satellite requirements. At present, the USSR is attempting to step up its oil sales to the Free World to an appreciable extent. This export drive is directly linked to the shortage of currency, but also to a long-term policy, the particular purpose of which, is to corner the markets of the Far East(1). The possibility that sales to the West may be slowed down by the need to supply satellites seems unlikely given what is, after all, the limited Western market for oil (cf. Table 28).

61. What the USSR would do if it really had to make a choice (involving any of the forms of energy) is an open question. The terms of trade seem, at least on the surface, to be favourable to transactions with the West, since deliveries are paid for in currencies which allow the USSR to import agricultural or industrial products (in this connection, consideration was given, at one point, to an agreement with Japan which was to supply ships in return for oil). However, in the longer term, the supply of energy to the satellites will permit the speedier economic development of the entire area and this will benefit the Soviet Union to the extent that, within a planned economy, the development of each partner has repercussions on the others, both because of the increased possibility of trade and because of the economic strength of the whole area in its relations with its outside partners (for example, EEC in this case). In other words, it is very much in the interest of the USSR to support the economic development of its partners.

62. The member countries of COMECON have also set themselves the target of co-ordinating their levels of development. The part played by energy in this process is obvious. No less obvious is the need for the USSR to participate to the utmost of its ability in this "gigantic" growth plan. It is forecast that, by 1980, the gaps in industrial production will have been all but closed. This appears in the table established by the Polish economist, A. BODNAR. The differences in the industrial levels of the COMECON countries are at present in the order of 1:4. This ratio should fall by 1980 to 1:1.6.

Per Capita Industrial Production

	<u>1962</u>	<u>1980</u>	Poland = 100
COMECON as a whole	115	110	(approx.)
Czechoslovakia	191	130	
Soviet Occupied Zone of Germany	185	130	
<u>Poland</u>	100	100	
Rumania	67	90	
Hungary	83	90	
USSR	116	130	
Bulgaria	52	80	

(1) A pipeline is being built to supply oil to Japan

63. The ideological aspect of COMECON, which rises above the purely economic to the political aspect, must not be overlooked. This has been recalled by the economists A. ALEXEEV and L. IVANOVA. "The far reaching qualitative and quantitative changes in the main branches of the national economies of the COMECON countries between 1966 and 1970 and up to 1980 will create the material foundations of socialism and communism. Progress planned will open up new prospects for higher production at lower cost and for greater productivity of labour and effectiveness of investments. All this will assure the victory of the socialist over the capitalist system in their peaceful economic contest." The problem of the energy structures of COMECON must therefore be seen as part of an overall economic strategy in which the USSR plays the leading part.

64. Will the Soviet Union, whose industrial development has slowed down during the past few years, be able to make the financial and technical effort which a project of this kind will require? This is the question which will have to be answered during the next few years. The advent of nuclear energy, with the large-scale investment which it demands, will make the problem particularly acute. There is reason to believe that this new technique will make the satellite countries even more dependent on the USSR, at least during the first stage when the necessary infrastructure is being constructed. It will equally increase the need for close co-operation, though it remains to be seen whether the Soviet Union will be able to satisfy fully the demands of the other COMECON countries.

CONCLUSION

65. These reflections on the energy problems of the COMECON countries do not pretend to be a thorough study of a manifestly complex question but only to highlight the importance of energy in the economic growth of the Bloc. This importance will be all the greater for the fact that the COMECON energy policy - apart from its purely economic aspects - is a kind of test of co-operation and the international division of labour.

66. The changing pattern of energy in the coming years will be of overriding interest owing to the fact that the growth of industrial production, the raising of the standard of living, the reduction of the gaps between developed and insufficiently developed countries and, more generally, the reduction of economic differences between socialist and capitalist countries, will be largely determined by the increase in co-operation between the USSR and the other COMECON countries. Will the final result be the "complete unification of the energy systems of the European socialist countries" forecast by Pravda, or will the process stop at the stage of growing and more or less organized multilateral trade?

67. The paramount importance to the COMECON countries of energy structures adapted to steeply rising requirements, structures which, according to numerous statements by the political leaders, it is firmly intended to create, and the large volume of investments devoted to energy in the development plans for 1966-1970 would all seem to indicate that the members of COMECON have realised the threat inherent in the growth of the energy gap and will combine to make their ambitions a reality. Failure in this field would compromise the future of COMECON for a long time to come.

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TABLES NOS. 1 to 31

NOTE ON METHODOLOGY

1. Primary energy output (cf. tables 1 and 2) means, in the present context, coal, lignite, oil, gas and hydro-electric power production expressed in millions of tons of standard fuel. The figures provided do not, therefore, cover petroleum products, coke or thermal electricity.

2. Production figures for coal and lignite (tables 3 and 9) include coal consumed for coke production (tables 4 and 10) as well as the coal and lignite used for the production of thermal electricity (tables 7 and 13).

3. Crude oil production figures (tables 5 and 11) include oil consumption for the production of petroleum products (tables 6 and 12) and the oil used (in the form of petroleum products) for the production of thermal electricity.

Table No. 1

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ANNEX to
AC/89-WP/183

PRODUCTION OF PRIMARY ENERGY
(in million tons of standard fuel (MT/SF))

	1955	1958	1960	1961	1962	1963	% of TOTAL	1965		
ALBANIA	0.4	0.7	1.2	1.3	1.3	1.4	0.1%			
BULGARIA	5.6	7.2	10.0	10.7	11.6	12.4	1.2%			
CZECHOSLOVAKIA	36.5	48.6	51.3	54.8	57.7	60.0	5.2%			
SOVIET OCCUPIED ZONE OF GERMANY	65.6	70.4	73.6	77.2	80.2	82.6	7.2%			
HUNGARY	13.9	13.5	15.1	16.3	16.8	18.3	1.5%			
POLAND	83.8	84.7	93.5	95.8	98.8	103.3	8.9%			
RUMANIA	27.0	31.6	34.9	36.4	40.0	42.7	3.6%			
USSR	435.5	580.5	662.7	705.5	763.5	824.7	70.7%			
YUGOSLAVIA	9.3	12.1	15.7	16.0	16.6	18.5	4.6%			
TOTAL	677.6	849.3	958	1,014	(1) + 5%	1,086.5	(1) + 6%	1,163.9	(1) + 7%	100 %
BLOC LESS USSR	242.1	268.8	295.3	308.5	+ 4%	323	+ 4%	339.2	+ 4%	
% BLOC LESS USSR OF TOTAL	35.8%	31.5%	30.4%	30.2%		29.7%		29.1%		

(1) % increase over previous year

Source: Statistical Handbook

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TABLEAU N° 2
TABLE N° 2

PRODUCTION D'ENERGIE PRIMAIRE DANS LE COMECON (+ YUGOSLAVIE)
FUEL AND POWER PRODUCTION COMECON + YUGOSLAVIA

Milliard MT/SF - Milliard metric/tons

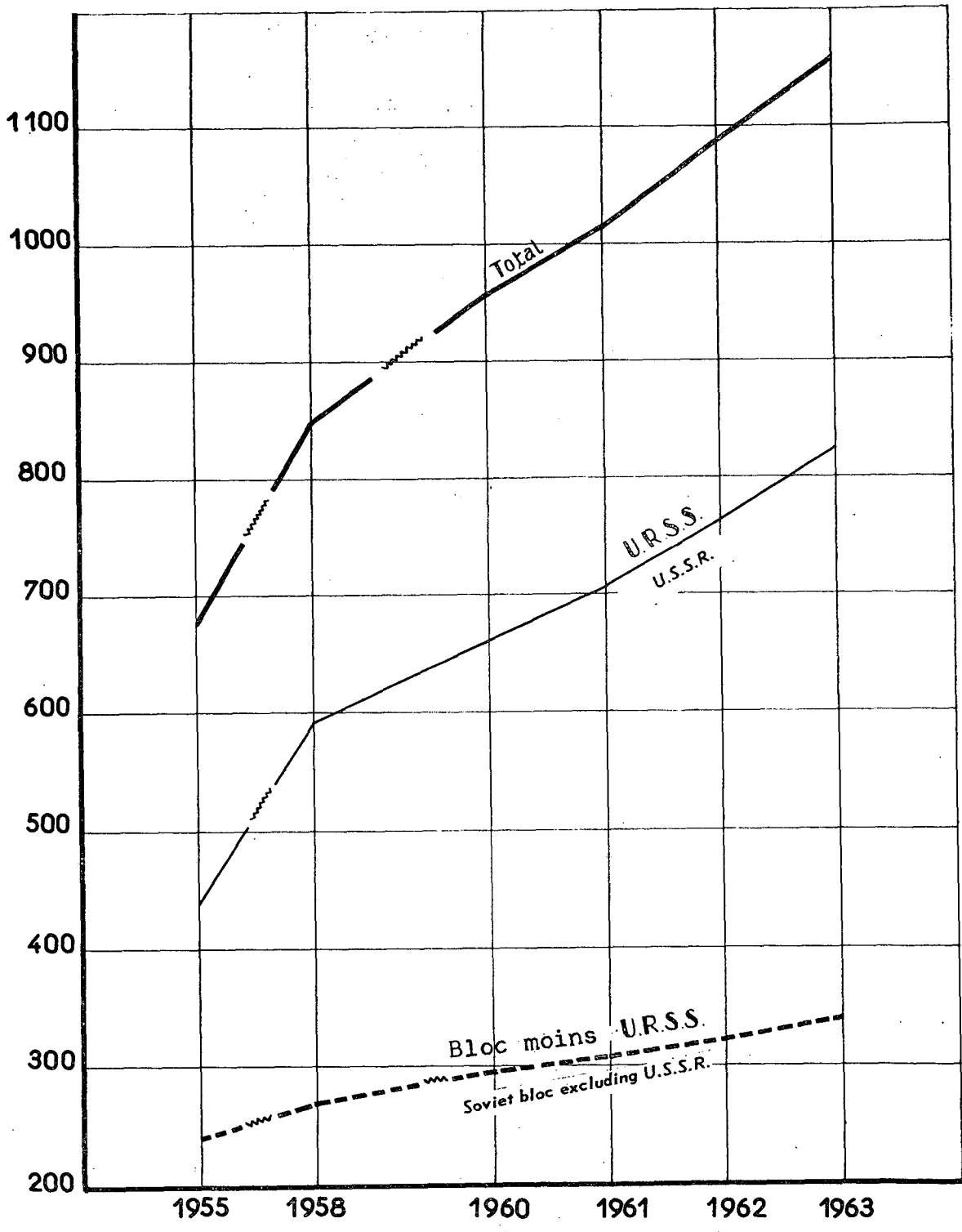


Table No. 3

NATO RESTRICTED
ANNEX to
AC/89-WP/183

COAL AND LIGNITE PRODUCTION

(1,000 T)	1955	1960	1962	1963	CONSUMPTION 1963(1)	BALANCE 1963 - : imports + : exports Balance equals net imports or exports	PLAN 1965
ALBANIA	194	290	300	252			
BULGARIA	10,051	17,147	20,841	21,900	21,865	+ 35	
CZECHOSLOVAKIA	61,000	84,100	96,100	100,700	100,921	- 221	
SOVIET OCCUPIED ZONE OF GERMANY	203,682	228,200	249,575	256,480	258,348	- 1,868	
HUNGARY	22,300	26,524	28,600	30,479	32,729(2)	- 2,690	
POLAND	100,500	113,300	121,100	128,300	105,664	+ 22,636	
RUMANIA	6,104	8,200	9,589	10,267	10,965	- 698	11,970
USSR	391,200	515,200	517,400	532,000	345,699	+186,301	553,000
YUGOSLAVIA	15,200	22,700	24,600	27,200	28,258	- 1,058	
TOTAL	810,231	1,013,661	1,068,005	1,107,578			
Bloc - USSR	419,031	500,461	550,605	575,578			
% of Total	51%	49%	51%	51%			

(1) Apparent consumption: Production - exports plus imports

(2) Actual consumption as shown in the Statistical Handbook.

% increase in production 1963/1960 : 8%

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Table No. 4

NATO RESTRICTED
ANNEX to
AC/89-WP/183

PRODUCTION AND CONSUMPTION OF METALLURGICAL COKE

(1,000 t.)	1955	1960	1962	1963	Consumption 1963	Balance 1963
ALBANIA					5.4	- 5.4
BULGARIA	9.6	20.3	7.7	128.3	445.6	- 317.3
CZECHOSLOVAKIA	5,460	6,842	7,348	7,742	5,984	+1,758
SOVIET OCCUPIED ZONE OF GERMANY	458	1,008	1,031	1,042	4,272	-3,230
HUNGARY	30	499	654	660	1,539	- 879
POLAND	6,127	7,712	7,920	8,360	6,008	+2,352
RUMANIA	144	820	1,119	1,141	2,059	- 918
USSR	43,593	56,233	60,929	63,900	60,758	+3,142
YUGOSLAVIA	731	1,083	1,107	1,090	1,319	- 229
TOTAL	56,552.6	74,217.3	80,117.7	84,063.3		
				4%		
BLOC USSR	12,959.6	17,984.3	19,188.7	20,163.3		
% of TOTAL	22%	24%	23%	23%		

% increase in production 1963/1960 : 13%

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Table No. 5

NATO RESTRICTED
ANNEX to
AC/89-WP/183

PRODUCTION AND CONSUMPTION OF CRUDE OIL

(1,000 T)	1955	1960	1962	1963	Consumption 1963	Balance 1963	Production forecasts for 1965	Production forecasts for 1970
ALBANIA	208	727.5	785	750	439.7	+ 310.3	1,000	1,500
BULGARIA	150	200	199	190	110.4	+ 79.6	400	1,000
CZECHOSLOVAKIA	107	137	177	200	4,417	- 4,217	200	400
SOVIET OCCUPIED ZONE OF GERMANY	-	-	30	50	3,213	- 3,163	200	300
HUNGARY	1,601	1,217	1,641	1,756	3,584	- 1,828	2,200	3,500
POLAND	180	194	202	212	1,628	- 1,416	200	300
RUMANIA	10,555	11,500	11,864	12,233	12,233	-	12,550	12,500
USSR	70,793	147,859	186,242	206,100	168,200	+37,900	240,000	350,000
YUGOSLAVIA	257	944	1,525	2,200	2,386	- 186		
TOTAL	83,851	162,778	202,665	223,691				
Bloc - USSR	13,058	14,919	16,423	17,591				
% of TOTAL	15.4%	9.1%	8.1%	7.8%				

Percentage increase 1963/1960 : 37%

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Table No. 6

NATO RESTRICTED
ANNEX to
AC/89-WP/183

PRODUCTION AND CONSUMPTION OF PETROLEUM PRODUCTS

(1,000 T.)	1955	1960	1962	1963	Consumption 1963	BALANCE 1963
ALBANIA	83	369	482	475	279	+ 196
BULGARIA	100	300	400	400	2,174	- 1,774
CZECHOSLOVAKIA	1,000	2,000	3,100	3,700		
SOVIET OCCUPIED ZONE OF GERMANY	2,100	3,100	3,700	4,000	3,148	+ 852
HUNGARY	1,600	2,400	2,800	3,100	3,235	- 135
POLAND	686	876	1,292	1,442	3,686	- 2,244
RUMANIA	10,100	11,000	11,300	11,400	5,935	+ 5,465
USSR	60,700	116,100	141,500	155,000	133,861	+ 21,139
YUGOSLAVIA	700	1,300	1,660	1,790	1,863	- 073
TOTAL	77,069	137,445	166,234	181,307		
Bloc - USSR	16,369	21,345	24,734	26,307		
	21.2%	15.6%	14.8%	14.7%		

% increase 1963/1960 : 31%

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Table No. 7

NATO RESTRICTED
ANNEX to
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PRODUCTION AND CONSUMPTION OF ELECTRICITY

(Milliard KW/h.)	1955	1960	1962	1963	Consumption 1963	Balance 1963	1965 PLAN	1970 PLAN
ALBANIA	0.08	0.19	0.24	0.25				
BULGARIA	2.07	4.60	6.04	7.10	7.2	- 0.09		
CZECHOSLOVAKIA	15.01	24.40	28.70	29.80	29.88	- 0.08		
SOVIET OCCUPIED ZONE OF GERMANY	28.70	40.30	45.10	47.45	47.44	+ 0.002		
HUNGARY	5.40	7.60	9.10	9.60	9.7 (1)	- 0.93		
POLAND	17.80	29.30	35.40	37.00	37.01	- 0.06		
RUMANIA	4.30	7.60	10.08	11.60	11.7	- 0.01		
USSR	170.20	292.27	369.28	412.00	411.2	+ 0.80	508.0	1,000
YUGOSLAVIA	4.34	9.14	11.20	13.50				
TOTAL	247.90	415.40	515.14	568.30		(2)		
Bloc - USSR	77.70	123.13	145.86	156.30				
% of Total	31.3%	29.5%	28.3%	27.5%				

(1) These are the actual consumption figures as shown in the handbook. The difference is explained by grid losses.

(2) % increase 1963/1960 : 36%

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Table No. 8

NATO RESTRICTED
ANNEX to
AC/89-WP/183

PRODUCTION AND CONSUMPTION OF GAS

(Millions of cu.m.)	1955	1960	1962	1963	Consumption 1963	Balance 1963	Plan 1965
ALBANIA							
BULGARIA							
CZECHOSLOVAKIA	173	1,443	1,400	1,500	1,500	-	
SOVIET OCCUPIED ZONE OF GERMANY	10	40	50	100	160	- 60	
HUNGARY	545	342	340	612	817.3	-205.3	
POLAND	393	549	821	983	1,283.9	-300.9	
RUMANIA	6,169	10,142	12,906	14,262	14,056.7	+205.3	13,700
USSR	8,981	45,303	73,525	89,800	89,853.9	+146.1	128,000
YUGOSLAVIA	55	53	95	91	91	-	
TOTAL	16,326	57,872	89,131	107,448			
Bloc - USSR	7,345	12,569	15,612	17,648			
% of TOTAL	44.8%	21.7%	17.5%	16.4%			

% increase 1963/1960 : 85%

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TABLEAU N° 9
TABLE N° 9

PRODUCTION D'ENERGIE (CHARBON & LIGNITE) EN 1963

FUEL OUTPUT (COAL AND LIGNITE) IN 1963

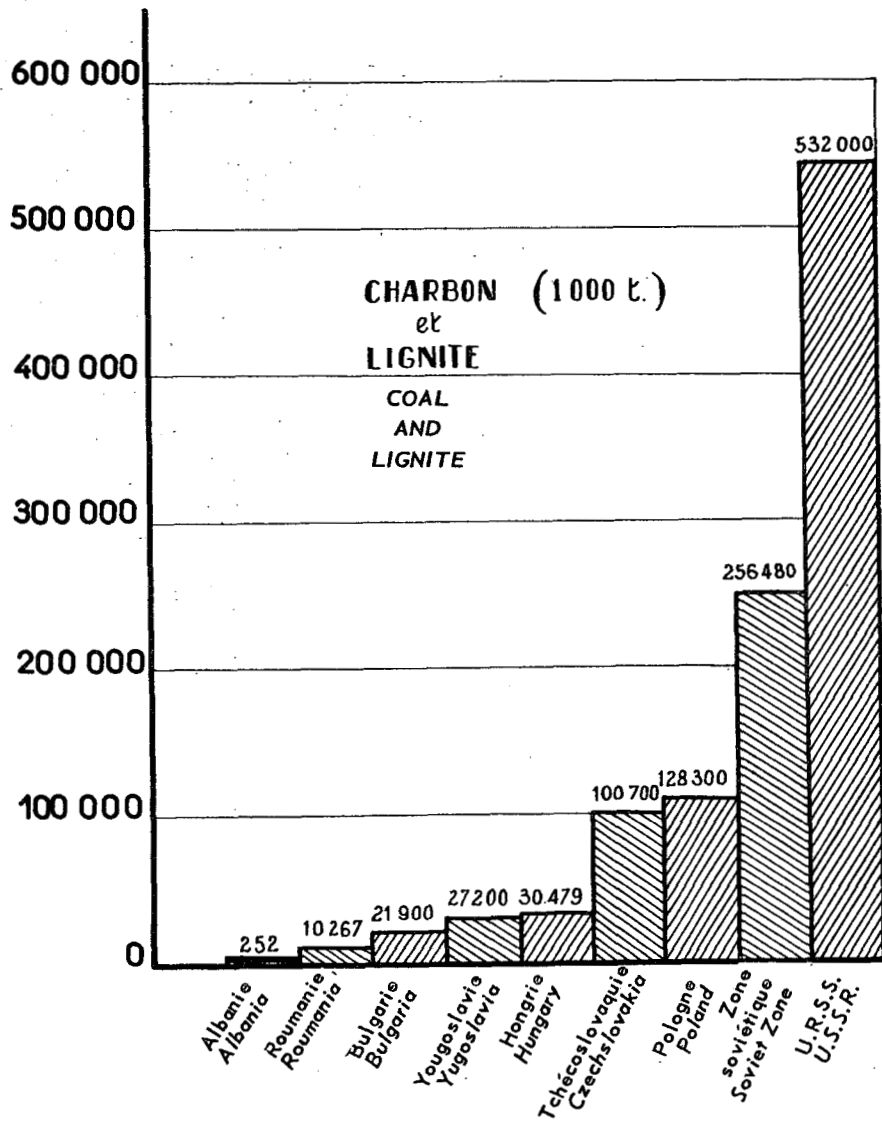


TABLEAU N° 10
TABLE N° 10

PRODUCTION D'ENERGIE (COKE) EN 1963

FUEL OUT PUT (COKE) IN 1963

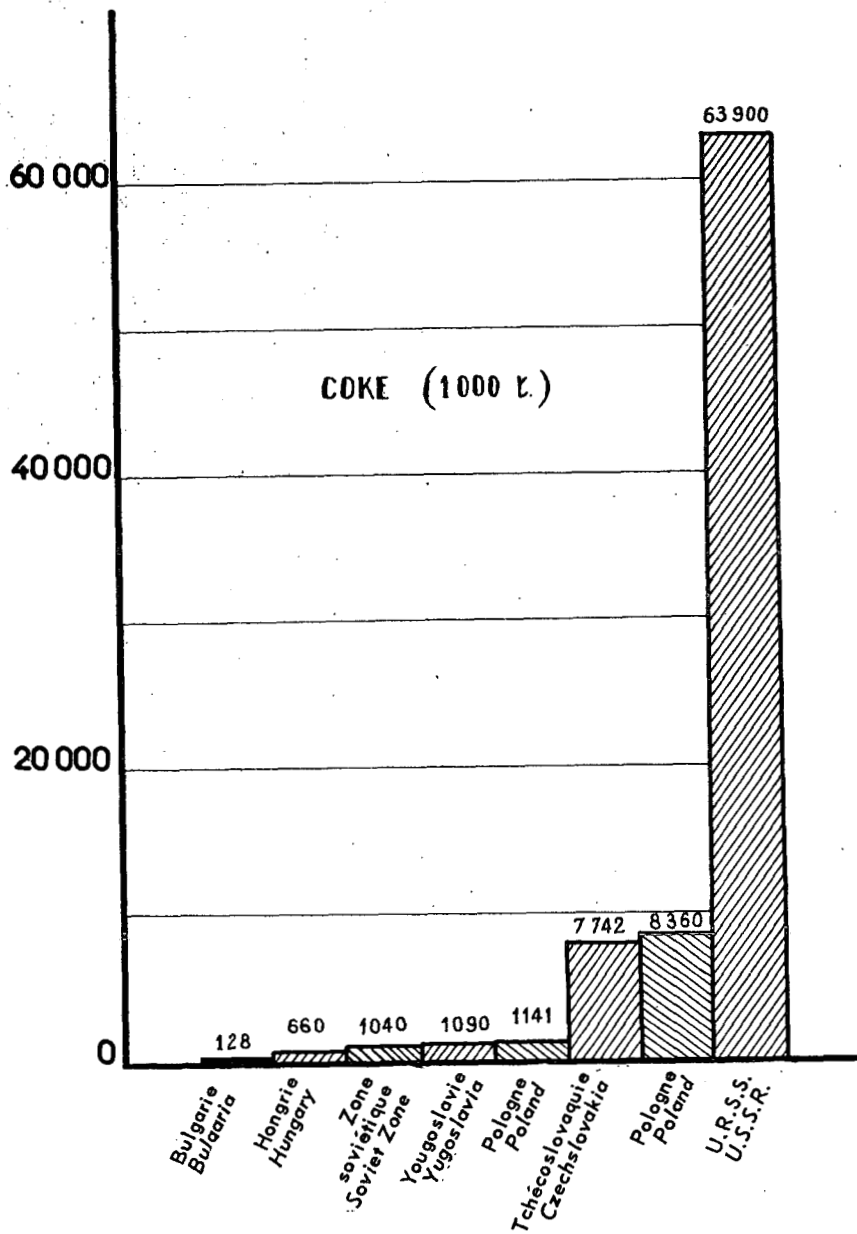


TABLEAU N° 11
TABLE N° 11

PRODUCTION D'ENERGIE (PETROLE BRUT) EN 1963

FUEL OUTPUT (CRUDE OIL) IN 1963

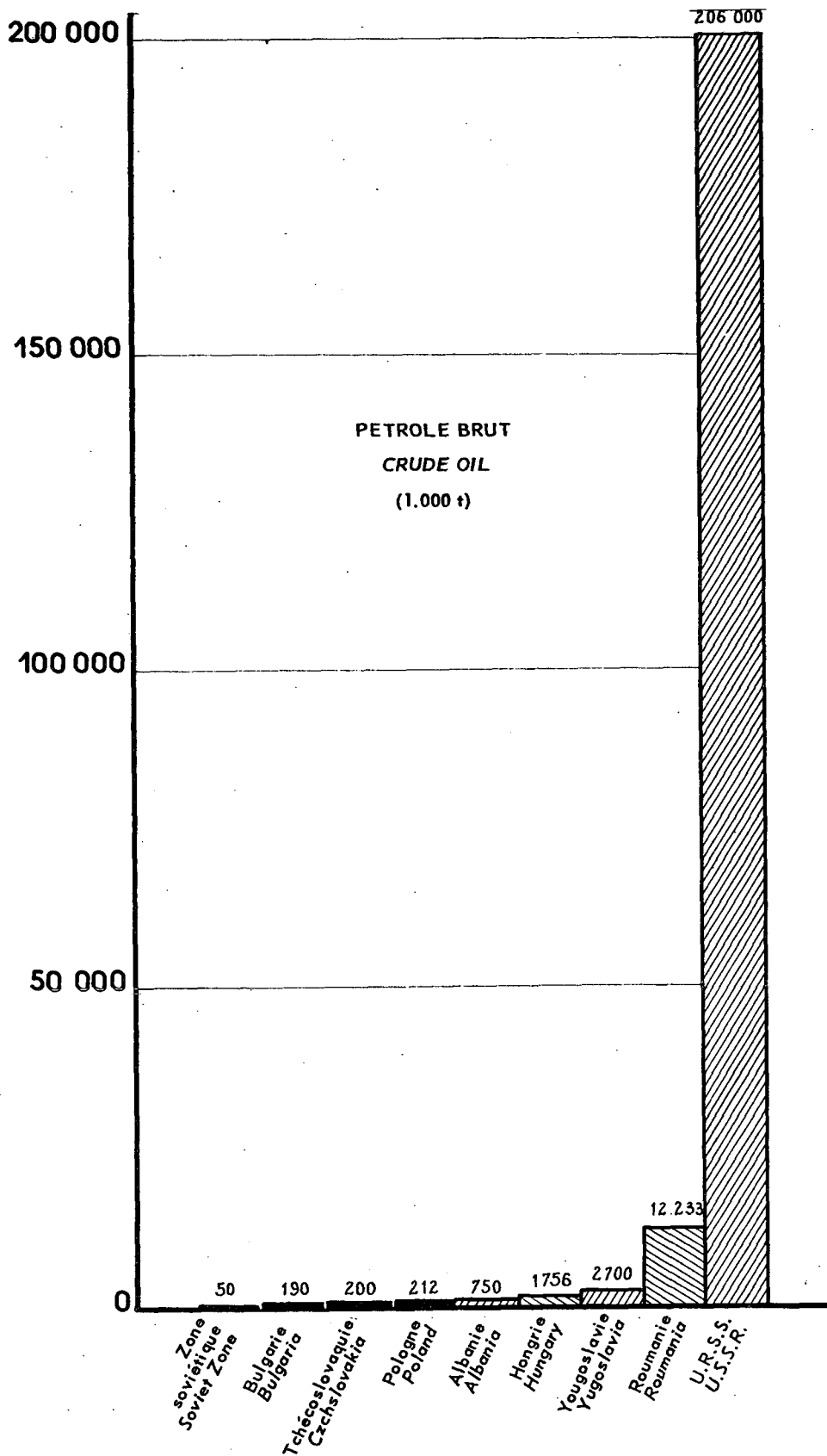


TABLEAU N° 12

TABLE N° 12

PRODUCTION D'ENERGIE (PRODUITS PETROLIERS) EN 1963

FUEL OUTPUT (PETROLEUM PRODUCTS) IN 1963

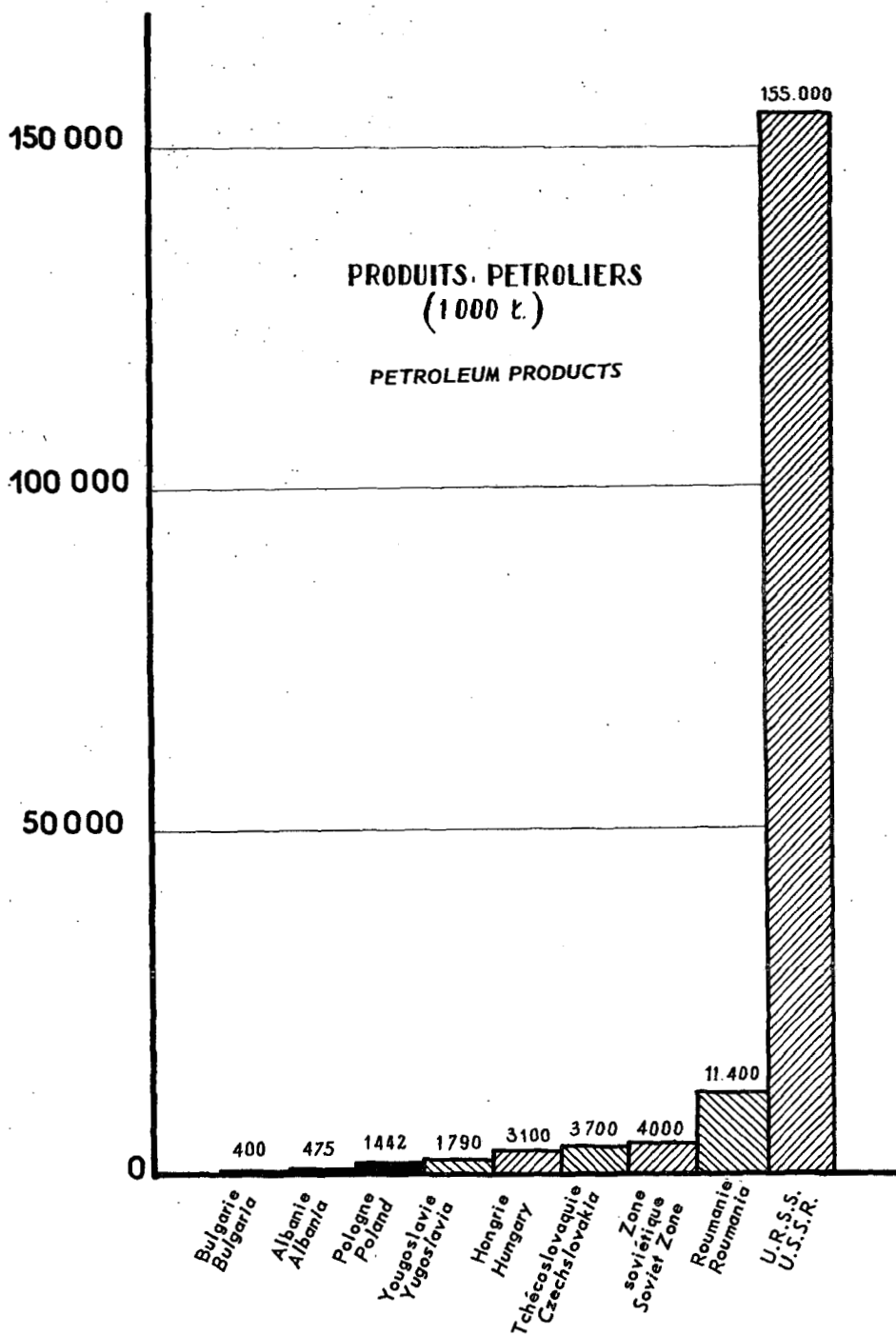
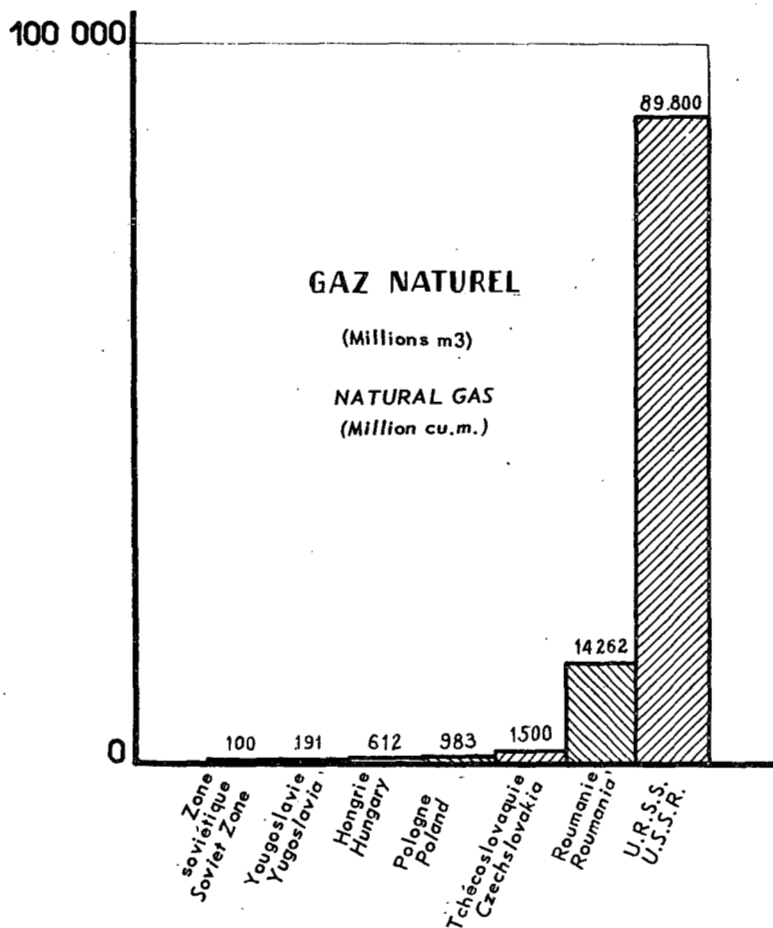
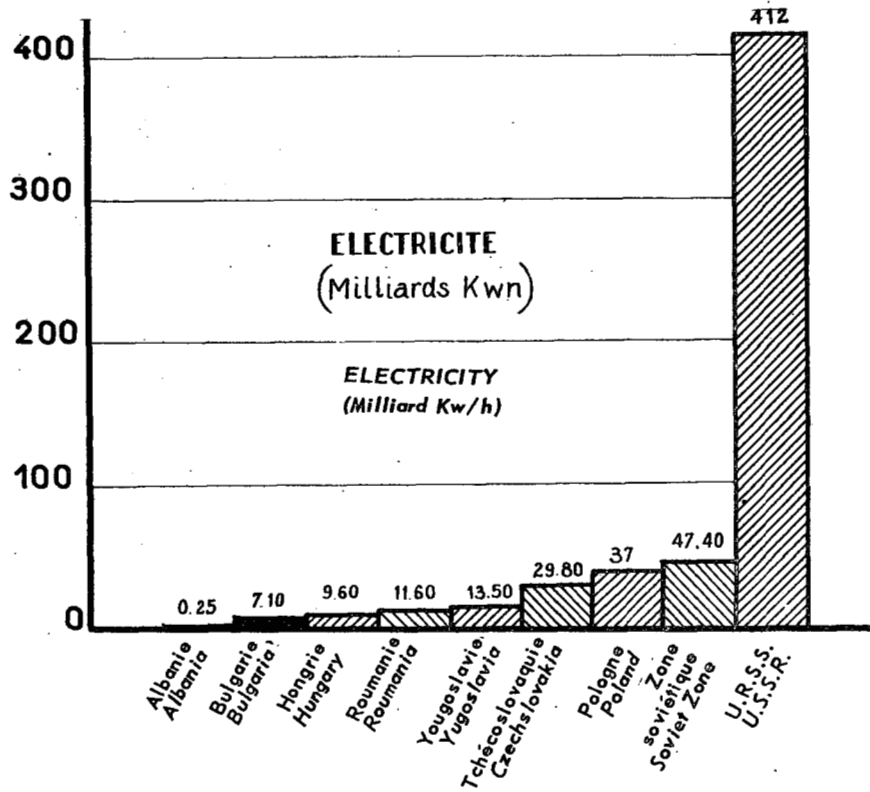


TABLEAU N° 13 PRODUCTION D'ENERGIE (ELECTRICITE - GAZ) EN 1963
TABLE N° 13 POWER PRODUCTION (ELECTRICITY AND GAS) IN 1963



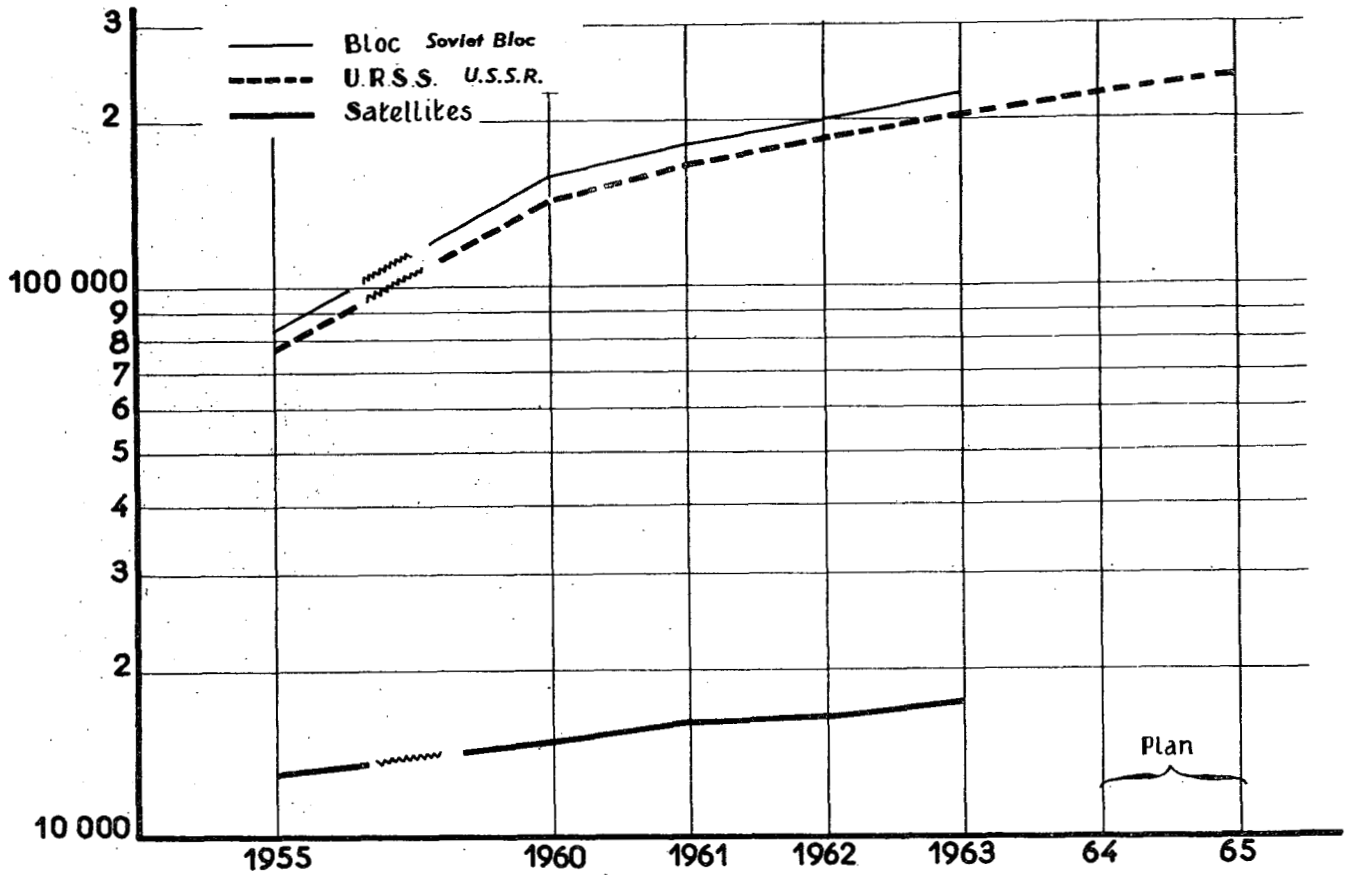
PER CAPITA ENERGY CONSUMPTION EXPRESSED IN Kg OF COAL

	1958	1959	1960	1961	1962	% $\frac{1962}{1961}$
BULGARIA	1,000	1,181	1,380	1,565	1,761	13%
CZECHOSLOVAKIA	4,682	4,590	4,724	5,125	5,417	5%
HUNGARY	2,065	2,180	2,312	2,496	2,542	2%
POLAND	2,884	2,995	3,097	3,182	3,278	3%
RUMANIA	1,177	1,253	1,391	1,433	1,640	14%
USSR	2,891	2,942	2,847	2,921	3,046	5%
YUGOSLAVIA	699	794	858	904	933	3%
Average Bloc energy consumption	2,463	2,540	2,656	2,821	2,976	
% increase over the previous year		3%	4%	6%	5%	

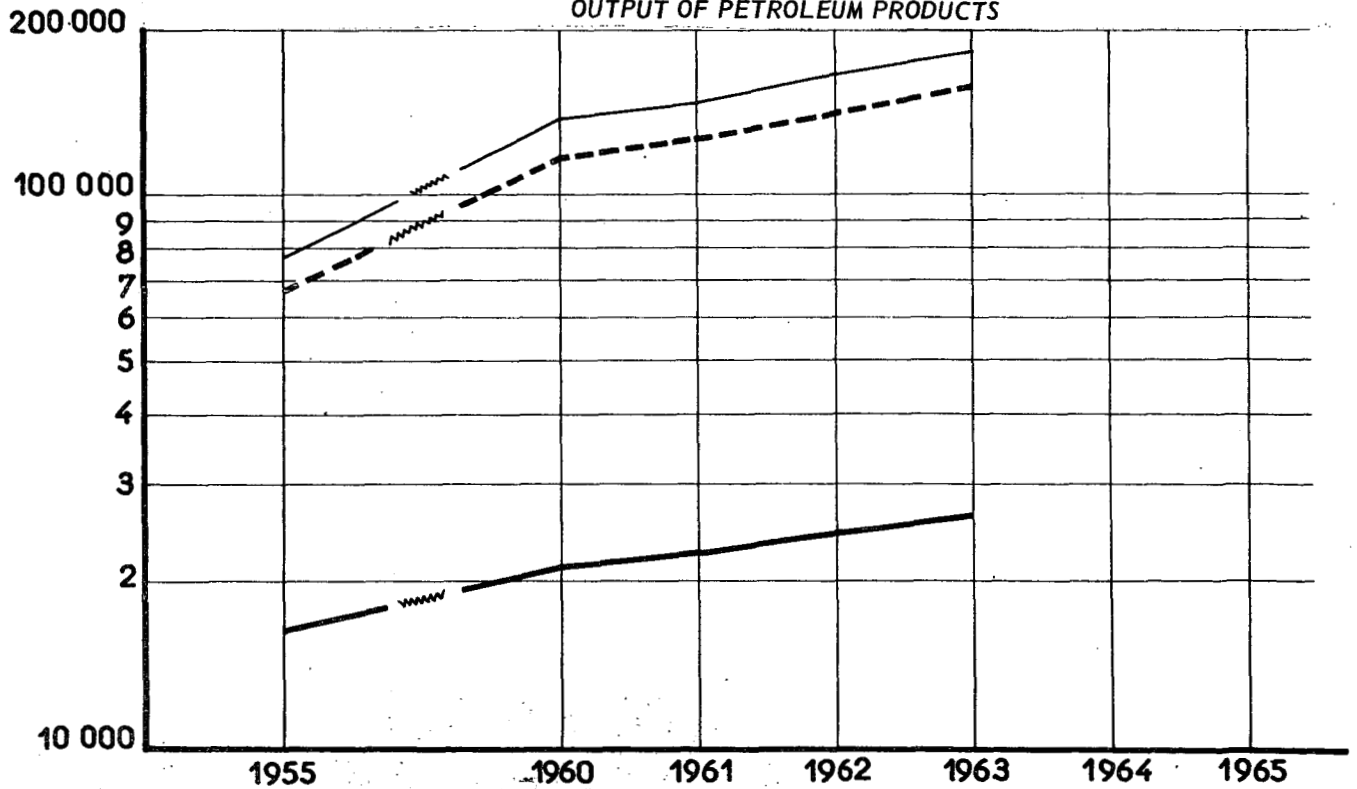
(Source: small Yugoslav statistical year book)

TABLEAU N° 15
TABLE N° 15

PRODUCTION DE PETROLE BRUT (1.000 t.)
OUTPUT OF CRUDE OIL



PRODUCTION DE PRODUITS PETROLIERS (1.000 t.)
OUTPUT OF PETROLEUM PRODUCTS



Echelle Semi-Logarithmique Semi-logarithmic Scale

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TABLEAU N° 16
TABLE N° 16

ECHANGES DE CHARBON (1.000 t.) EN 1963
EXPORTS AND IMPORTS OF COAL IN 1963 (1.000 t.)

---> Livraisons U.R.S.S. vers satellites
Soviet deliveries to Satellites
-> Echanges Intersatellites
Trade between Satellites
| I Imports
E Exports

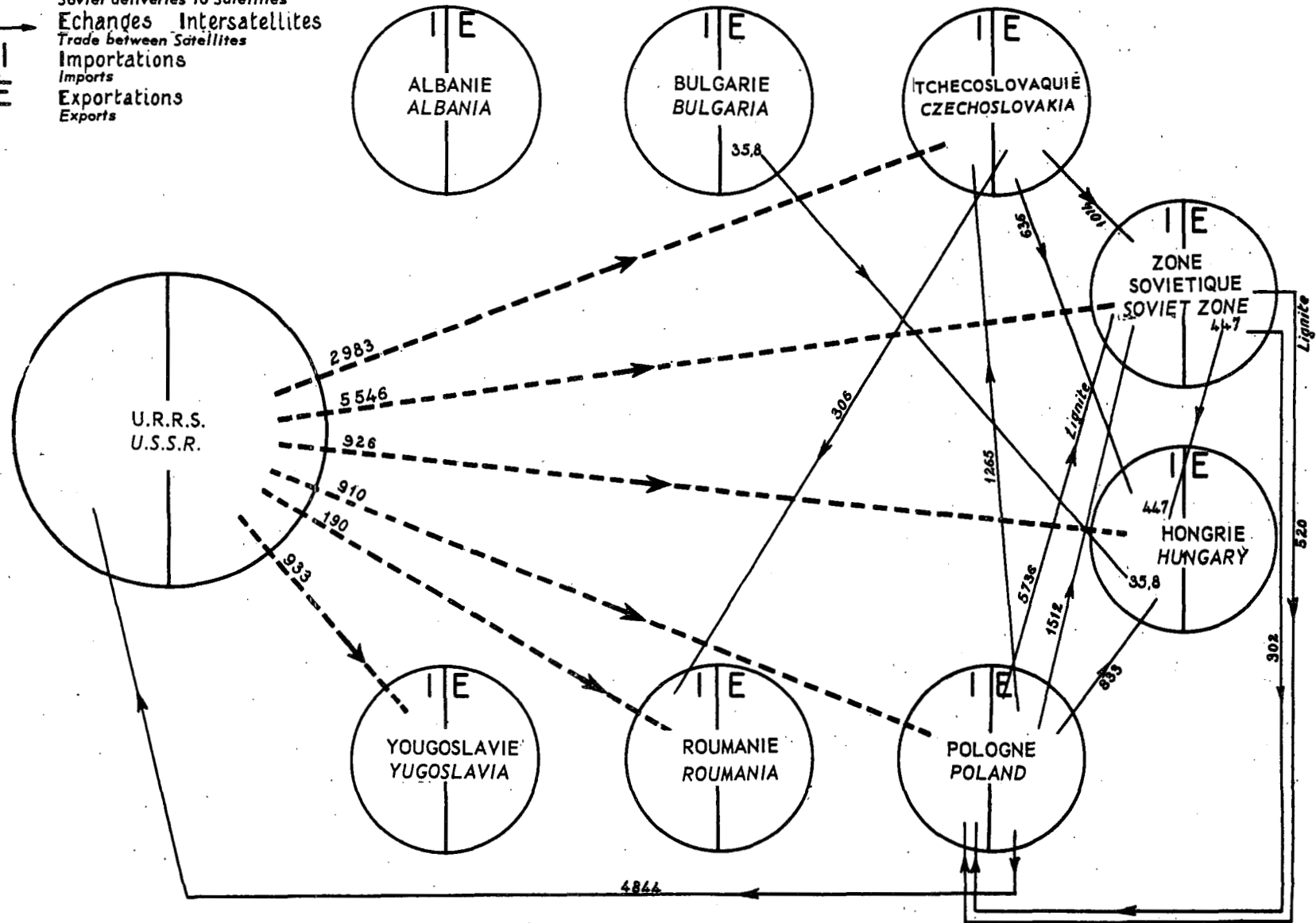


TABLEAU N° 17
TABLE N° 17

ECHANGES DE COKE (1.000 t.) EN 1963
EXPORTS AND IMPORTS OF COKE IN 1963 (1.000 t.)

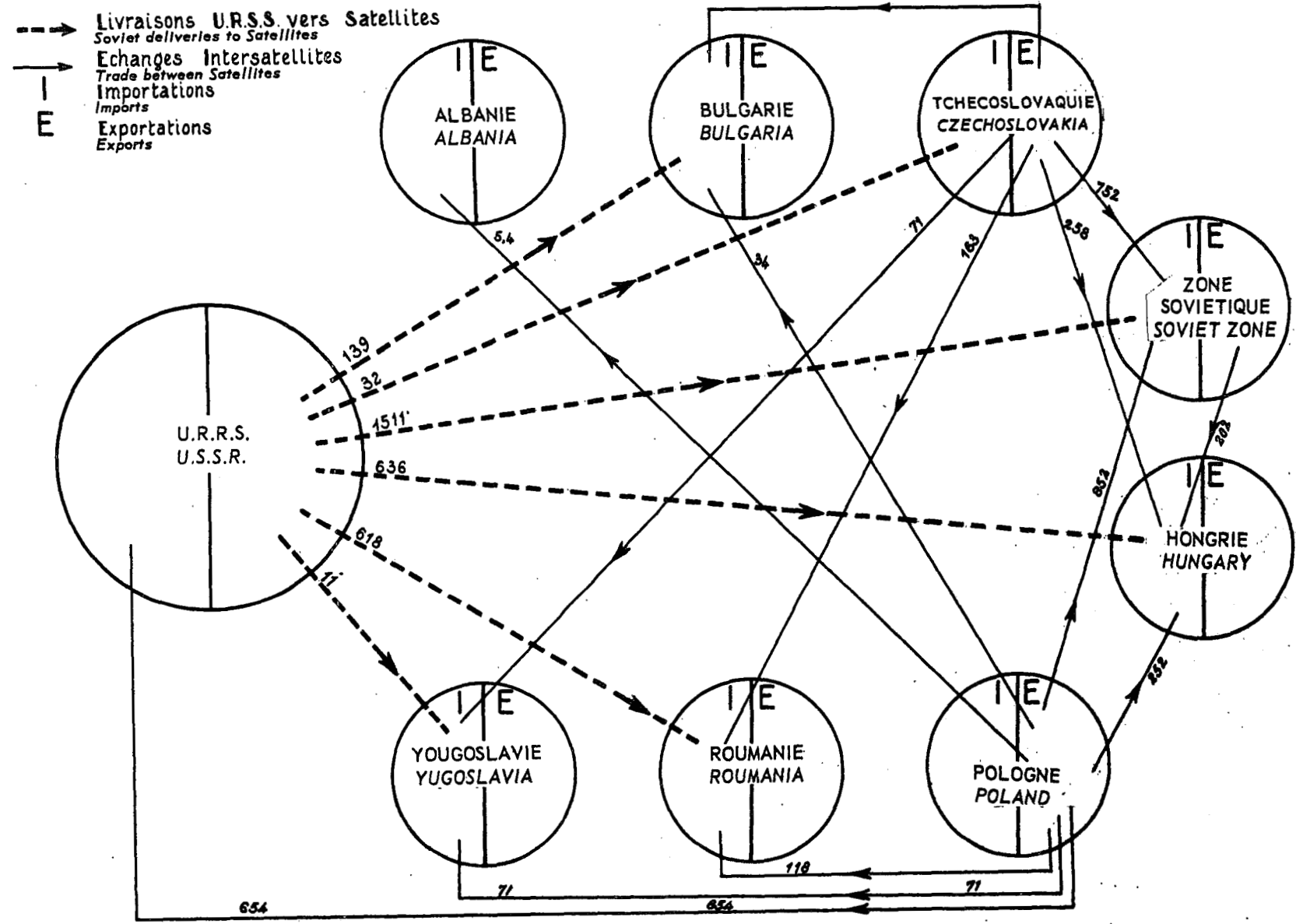


TABLEAU N° 18
TABLE N° 18

ECHANGES DE PETROLE BRUT (1.000 t.) EN 1963
EXPORTS AND IMPORTS OF CRUDE OIL IN 1963 (1.000 t.)

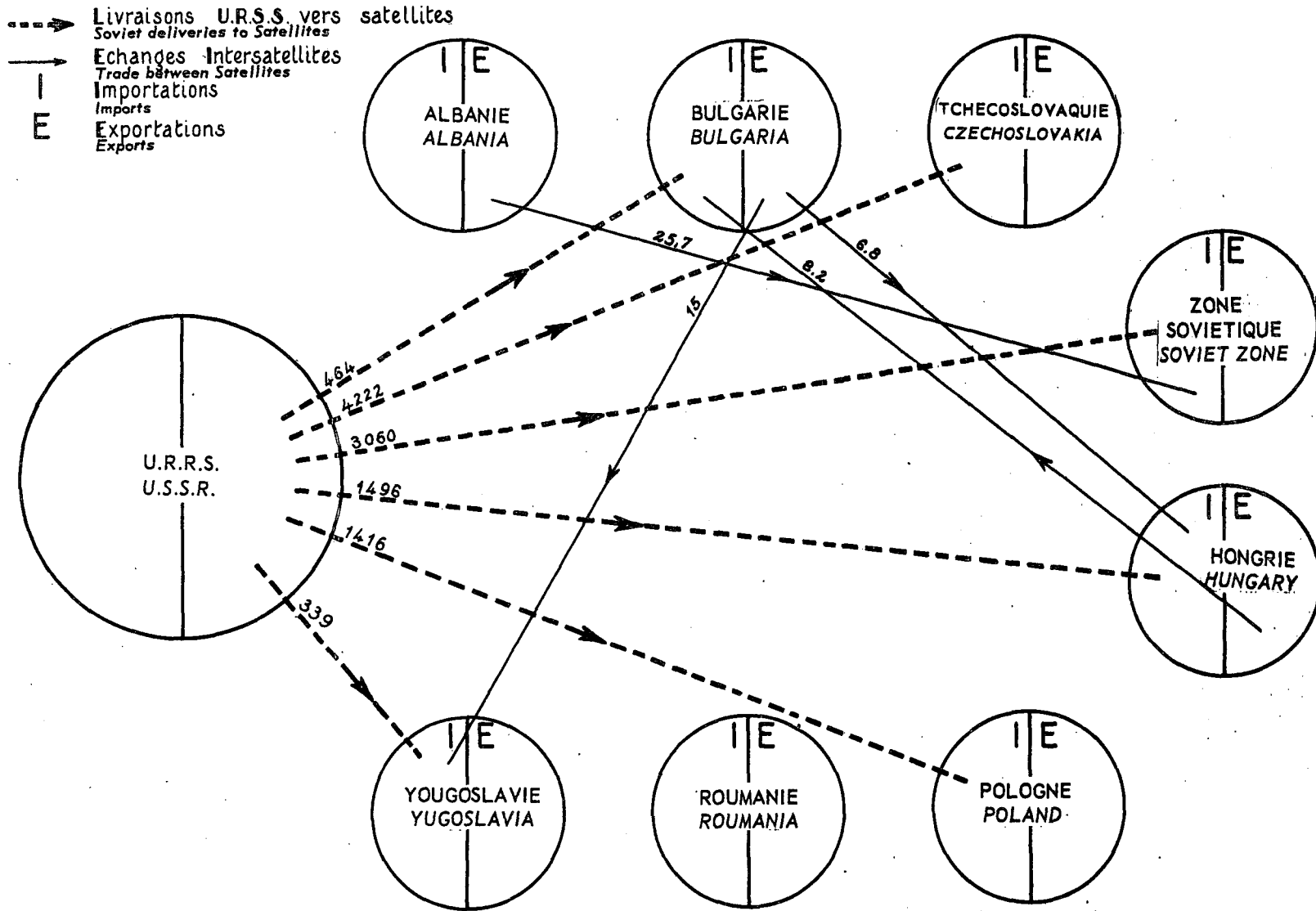
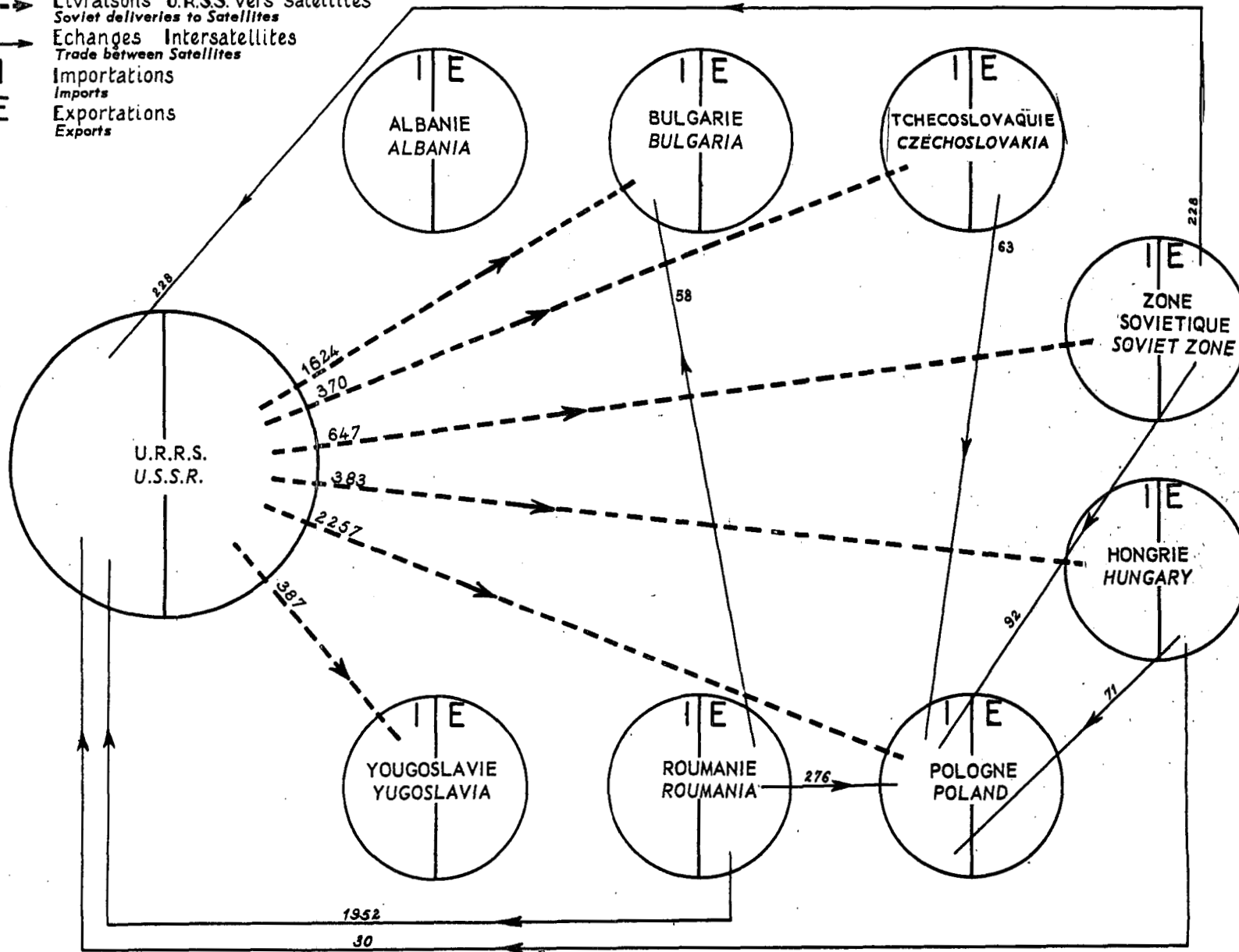


TABLEAU N° 19
TABLE N° 19

ECHANGES DE PRODUITS PETROLIERS (1.000 t.) EN 1963
EXPORTS AND IMPORTS OF PETROLEUM PRODUCTS IN 1963 (1.000 t.)

---> Livraisons U.R.S.S. vers satellites
Soviet deliveries to Satellites
-> Echanges Intersatellites
Trade between Satellites
| I | Imports
| E | Exports



ECHANGES D'ELECTRICITE (Millions KWH) EN 1963
EXPORTS AND IMPORTS OF ELECTRICAL POWER IN 1963 (Million Kw/h)

TABLEAU N° 20
TABLE No 20

- > Livraisons U.R.S.S. vers satellites
Soviet deliveries to satellites
- > Echanges Intersatellites
Trade between satellites
- > Importations
Imports
- > Exportations
Exports

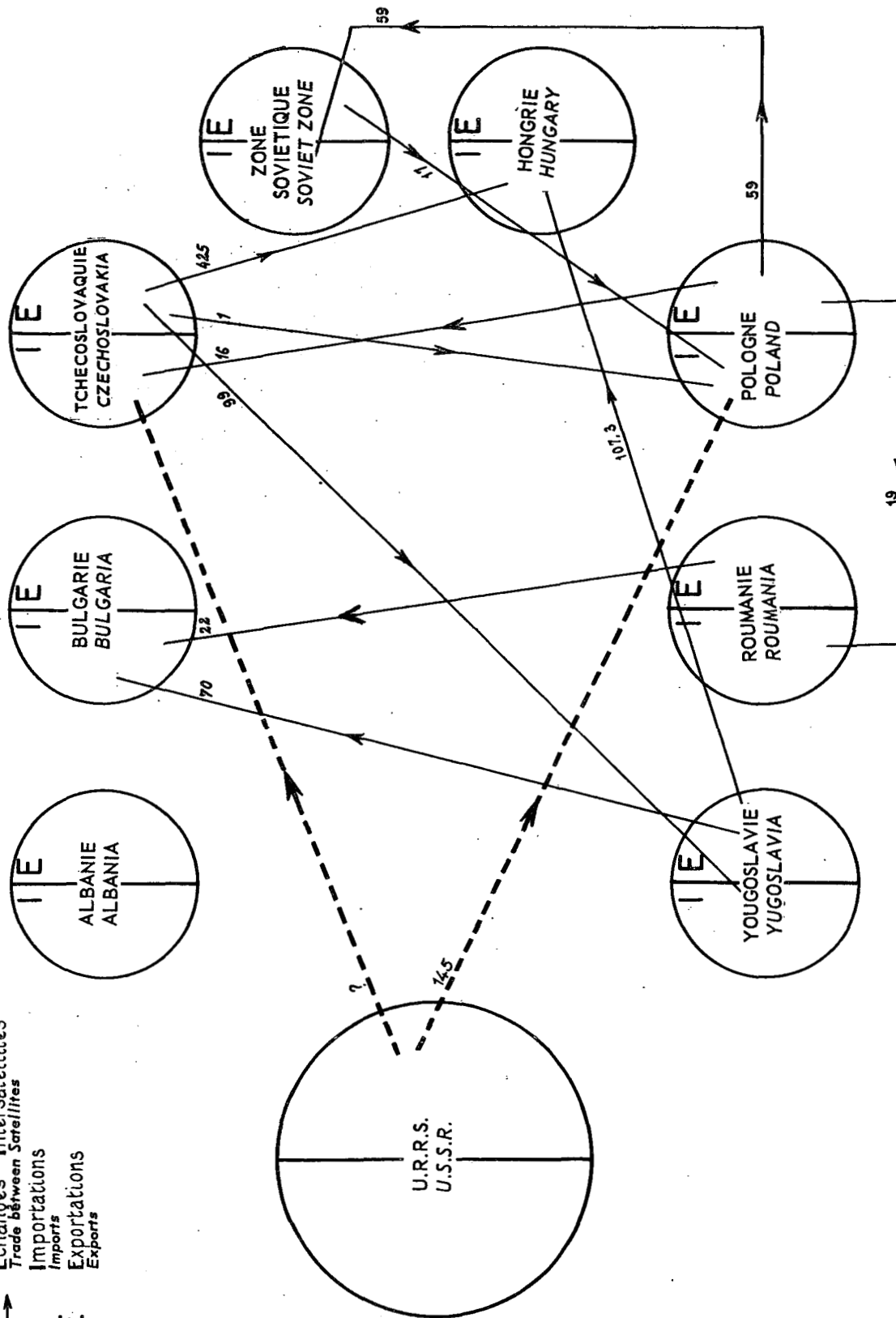


TABLEAU N° 21
TABLE N° 21

ECHANGES DE GAZ (Millions m3) EN 1963
EXPORTS AND IMPORTS OF GAS IN 1963 (Million cu.m.)

- - - - -> Livraisons U.R.S.S. vers satellites
 Soviet deliveries to Satellites
 - - - - -> Echanges Intersatellites
 Trade between Satellites
 |> Importations
 Imports
 E Exportations
 Exports

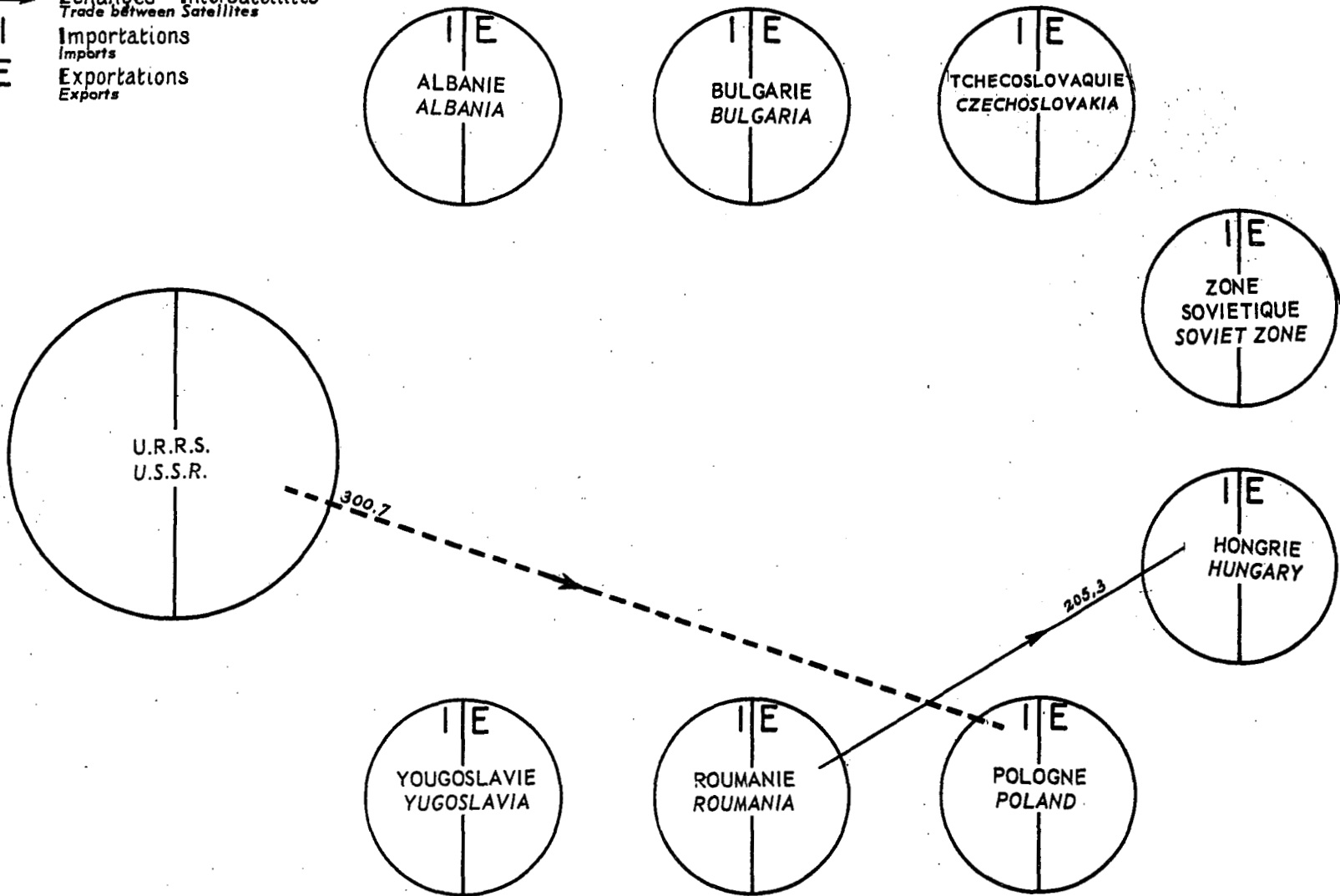


Table No. 22

COAL AND LIGNITE TRADE (T. 1,000) FOR 1963

NATO RESTRICTED
ANNEX to
AC/89-WP/183

Exported by Imported by	ALBA- NIA	BULGA- RIA	CZECH- OSLOV- AKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUN- GARY	POLAND	RUMAN- IA	USSR	YUGO- SLAV- IA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in re- lation to consumption
ALBANIA												
BULGARIA												
CZECHOSLOVAKIA						1,265		2,983		4,248	4,346	4.3%
SOVIET OCCUPIED ZONE OF GERMANY			1,014			1,512 (5,736 lignite)		5,546		8,072	8,849	3.4%
HUNGARY		35.8	636	447.2 (lig- nite)		833		926		2,430.8	2,690	8.2%
POLAND				302 (520 lignite)				910		1,732	1,742	1.5%
RUMANIA		306						190		496	697.9	6.3%
USSR						4,844				4,844	4,844	1.4%
YUGOSLAVIA		1.0						1,057		1,058	1,439	5 %
TOTAL EXPORTS TO BLOC		36.8	2,956			13,790		11,112				
TOTAL EXPORTS		36.8	4,125	6,981	-	22,636	-	21,362				

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Table No. 23

NATO RESTRICTED
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COKE TRADE (T. 1,000)

Exported by Imported by	ALBA- NIA	BULGA- RIA	CZECH- OSLOV- AKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUNG- ARY	POLAND	RUMAN- IA	USSR	YUGO- SLAV- IA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in relation to consumption
ALBANIA						5.4				5.4	5.4	100%
BULGARIA			144			34		139		317	317	71.2%
CZECHOSLOVAKIA								32		32	32	0.5%
SOVIET OCCUPIED ZONE OF GERMANY			752			852		1,511		3,115	3,230	75.5%
HUNGARY			258	(202)		232		636		1,328	1,328	86.3%
POLAND								-		-	-	
RUMANIA			163			118		618		899	918	44.6%
USSR						654				654	654	1 %
YUGOSLAVIA			71			71		11		153	229	17.3%
TOTAL EXPORTS TO BLOC			1,388			1,848		2,947				
TOTAL EXPORTS	-	-	1,758	-	-	2,352	-	3,796	-			

The figure in brackets is open to question

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Table No. 24

NATO RESTRICTED
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CRUDE OIL TRADE (T. 1,000)

Exported by / Imported by	ALBANIA	BULGARIA	CZECHOSLOVAKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUNGARY	POLAND	RUMANIA	USSR	YUGOSLAVIA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in relation to consumption
ALBANIA										-	-	
BULGARIA					8			(464)		472	472	
CZECHOSLOVAKIA								4,222		4,222	4,222	95.5%
SOVIET OCCUPIED ZONE OF GERMANY	85.7							3,060		3,145.7	3,163	98.4%
HUNGARY		6.8						1,496		1,502.8	1,828	51 %
POLAND								1,416		1,416	1,416	86.9%
RUMANIA										-	-	
USSR										-	-	
YUGOSLAVIA		15.7						339		354.7	746	31.2%
TOTAL EXPORTS TO BLOC	85.7	22.5	-	-	8	-	-	10,997	-			
TOTAL EXPORTS	310	79.6	-	-	8	-	-	30,242	560			

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Table No. 25

NATO RESTRICTED
ANNEX to
AC/89-WP/183

TRADE IN PETROLEUM PRODUCTS (T1000)

Exported by / Imported by	ALBANIA	BULGARIA	CZECHOSLOVAKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUNGARY	POLAND	RUMANIA	USSR	YUGOSLAVIA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in relation to consumption
ALBANIA											(1)	
BULGARIA	49						58	1,624		1,731	1,774	81.5%
CZECHOSLOVAKIA	7							370				
SOVIET OCCUPIED ZONE OF GERMANY	6							647				
HUNGARY	9							383				
POLAND	36		63	92	71		276	2,257		2,809	2,834	76.9%
RUMANIA	7									-	-	
USSR				228	30		1,952			2,216	2,340	
YUGOSLAVIA	4		13	45			63				152	
TOTAL EXPORTS TO BLOC						-		5,168				
TOTAL EXPORTS	196			852		590	5,921	21,139	79			

(1) The blanks in this column are due to the absence of detail in the statistical year books.

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Table No. 26

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ANNEX to
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TRADE IN ELECTRICITY (Millions de KWH)

Exported by Imported by	ALBA- NIA	BULGA- RIA	CZECHO- SLO- VAKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUNG- ARY	POLAND	RUMA- NIA	USSR	YUGO- SLAV- IA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in relation to consump- tion(2)
ALBANIA												
BULGARIA							22		70	92	92	
CZECHOSLOVAKIA						16		?		611	(611)	
SOVIET OCCUPIED ZONE OF GERMANY						59					343(1)	
HUNGARY			425	5.2		10.8		437	(107)		931	
POLAND			1	17				145		163	163	
RUMANIA						19				19	19	
USSR										-	-	
YUGOSLAVIA			99									
TOTAL EXPORTS TO BLOC		-				94	22		177			
TOTAL EXPORTS		-	526	345		94	22	803	344			

(1) Including compensatory exchanges of electrical energy between Poland, Czechoslovakia and the Soviet Occupied Zone of Germany.

(2) Insignificant percentages due to re-exports.

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Table No. 27

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ANNEX to
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GAS TRADE (Million cu.m.)

Exported by Imported by	ALBA- NIA	BULGA- RIA	CZECHO- SLO- VAKIA	SOVIET OCCUPIED ZONE OF GERMANY	HUNG- ARY	POLAND	RUMA- NIA	USSR	YUGO- SLAV- IA	TOTAL BLOC IMPORTS	TOTAL IMPORTS	% of imports in relation to consumption
ALBANIA												
BULGARIA												
CZECHOSLOVAKIA												
SOVIET OCCUPIED ZONE OF GERMANY										-	59.8	37%
HUNGARY							205.3			205.3	205.3	25%
POLAND								300.9		300.9	300.9	22%
RUMANIA												
USSR												
YUGOSLAVIA												
TOTAL EXPORTS TO BLOC							205.3	300.9				
TOTAL EXPORTS							205.3	300.9				

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Table No. 28

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ANNEX to
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SOVIET EXPORTS OF OIL AND PETROLEUM PRODUCTS (Millions of tons)

	1955	1958	1960	1961	1962	1963	1964	1965
<u>CRUDE OIL</u>								
Free World countries	2.9	9.1	17.8	23.4	26.3	30.2		
Communist countries	0.68	3.9	9.0	13.3	13.6	15.0	18.0	21.0
<u>PETROLEUM PRODUCTS</u>								
Free World countries	2.2	5.2	8.8	10.1	12.6	15.2		
Communist countries	5.1	5.0	15.4	17.8	19.1	21.1		
	3.1	9.3	9.1	9.5	11.1	13.0	12.6	13.0
	2.0	3.8	6.3	8.3	8.0	8.1		
<u>TOTAL</u>	8.0	18.1	33.2	41.2	45.4	51.3		

Table No. 29

NATO RESTRICTED
ANNEX to
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SOVIET BALANCE OF ENERGY

Unit: Millions of metric tons of standard fuel

	1961		1962		1965 (Plan)		1970 (Plan)	
<u>TOTAL ENERGY OUTPUT</u>	755.9	% of total production	811.3	% of total production	999	% of total production	1,385	% of total production
- including coal	370.1	49.0	379.3	46.8	403	40.4	453	32.7
- oil	237.5	31.4	266.1	32.8	350	35.0	515	37.2
- gas	70.8	9.4	85.9	10.6	152	15.2	293	21.2
<u>TOTAL ENERGY CONSUMPTION</u>	688	% of total consumption	732.5		886		1,200	
- including coal	358.2	52.0	364	49.7	378	42.6	416	34.7
- oil	181.9	26.4	203	27.7	264	29.9	373	31.1
- gas	70.4	10.2	85.5	11.7	151	17.0	292	24.3
<u>NET APPARENT TRADE IN ENERGY</u> (+ exports) (- imports)	+ 67.9		+ 78.8		+ 113		+ 185	

(Source: National Petroleum Council)

NATO RESTRICTED

Table No. 30

FORECASTS OF ENERGY OUTPUT	UNIT OF MEASUREMENT	1965 (Plan)	1970 (Approximately)	LEVEL <u>1970</u> / <u>1965</u>
<u>P O L A N D</u>				
coal				
crude oil	1000 T	250	300	1.2 times
electrical energy	MKWh			
gas	cu.m.			
<u>R U M A N I A</u>				
coal	1000 T	11,970	20,000 22,000	1.7 1.8 times
crude oil	1000 T	12,550	13,100 13,300	5%
electrical energy	MKWh	17,700	32,000 34,000	1.8 1.9 times
methane gas	cu.m.	13,700	18,500	1.4 times
<u>U S S R</u>				
coal	1000 T	550,000	686,700	1.2 times
crude oil	1000 T	245,000	360,000	1.4 times
electrical energy	MKWh	508,000	900-1,000	1.9 2 times
gas				
<u>SOVIET OCCUPIED ZONE OF GERMANY</u>				
hard coal	1000 T		126,000	
electrical energy	MKWh		66-67,000	
<u>B U L G A R I A</u>				
coal	1000 T	11,300	50-55,000	
crude oil			4,000	
petroleum products		2,000	10,000	
natural gas	cu.m.		2,000	
electrical energy	MKWh	11,300	50-55,000	

TABLEAU N° 31
TABLE N° 31

EXPORTATIONS PETROLIERES DE L'U.R.S.S.
(Milliards de tonnes)
SOVIET OIL EXPORTS
(Milliard tons)

