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**ECONOMIC INTELLIGENCE REPORT**

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**SOLID FUELS AND COAL GAS  
IN BULGARIA, RUMANIA, AND ALBANIA**



CIA/RR 57  
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**CENTRAL INTELLIGENCE AGENCY**

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(ORR Project 26.200)

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CONTENTS

	<u>Page</u>
Summary . . . . .	1
I. Bulgaria . . . . .	5
A. Introduction . . . . .	5
B. Coal . . . . .	5
1. General . . . . .	5
2. Organization . . . . .	7
3. Production . . . . .	7
4. Foreign Trade . . . . .	8
5. Stocks . . . . .	11
6. Consumption . . . . .	11
7. Reserves . . . . .	12
8. Deposits . . . . .	13
9. Technology . . . . .	14
10. Labor . . . . .	15
C. Fuel Briquettes . . . . .	16
D. Coke . . . . .	17
1. Production . . . . .	17
2.. Imports . . . . .	17
3. Consumption . . . . .	17
E. Fuelwood . . . . .	17
1. Production . . . . .	17
2. Consumption . . . . .	18
F. Capabilities, Vulnerabilities, and Intentions . . . . .	18
1. Capabilities . . . . .	18
2. Vulnerabilities . . . . .	18
3. Intentions . . . . .	18

S-E-C-R-E-T

	<u>Page</u>
II. Rumania . . . . .	19
A. Introduction . . . . .	19
B. Coal . . . . .	19
1. General . . . . .	19
2. Supply . . . . .	22
3. Consumption . . . . .	25
4. Deposits, Reserves, and Quality . . . . .	27
5. Technology . . . . .	28
C. Fuel Briquettes . . . . .	31
D. Coke . . . . .	32
1. General . . . . .	32
2. Supply . . . . .	33
3. Consumption . . . . .	35
E. Fuelwood . . . . .	35
1. General . . . . .	35
2. Supply . . . . .	36
3. Consumption . . . . .	37
4. Reserves . . . . .	37
F. Peat . . . . .	37
1. General . . . . .	37
2. Supply . . . . .	38
3. Consumption . . . . .	38
4. Deposits, Reserves, and Quality . . . . .	38
5. Technology . . . . .	38
G. Manufactured Gas . . . . .	38
H. Capabilities, Vulnerabilities, and Intentions . . . . .	39
1. Capabilities . . . . .	39
2. Vulnerabilities . . . . .	39
3. Intentions . . . . .	40

S-E-C-R-E-T

	<u>Page</u>
III. Albania . . . . .	40
A. Introduction . . . . .	40
B. Coal . . . . .	41
1. Production . . . . .	41
2. Trade . . . . .	44
3. Consumption . . . . .	44
4. Reserves . . . . .	45
C. Coke . . . . .	45
D. Fuelwood . . . . .	45
E. Stockpiles . . . . .	46
F. Capabilities, Vulnerabilities, and Intentions . . . . .	46
1. Capabilities . . . . .	46
2. Vulnerabilities . . . . .	47
3. Intentions . . . . .	47

Appendixes

Appendix A. Statistical Tables . . . . .	49	
Appendix B. Coal Deposits in Bulgaria . . . . .	55	
Appendix C. Coal Mines in Albania . . . . .	59	
Appendix D. Methodology . . . . .	61	50X1



Tables

1. Estimated Balance of Sources of Primary Energy Produced in Bulgaria, 1954 . . . . .	6
---	---

S-E-C-R-E-T

	<u>Page</u>
2. Estimated Production of Coal in Bulgaria, 1950-54 and 1957 . . . . .	9
3. Estimated Consumption of Coal in Bulgaria by Major Consuming Sector, 1950-54 . . . . .	12
4. Estimated Reserves of Coal in Bulgaria, 1947 . . . . .	13
5. Estimated Balance of Sources of Primary Energy Produced in Rumania, 1954 . . . . .	20
6. Estimated Production of Coal in Rumania, 1950-55 . . . . .	23
7. Estimated Consumption of Coal Produced in Rumania, 1953 . . . . .	26
8. Estimated Balance of Sources of Primary Energy Produced in Albania, 1954 . . . . .	42
9. Estimated Production of Lignite in Albania, 1950-55 . . . . .	43
10. Estimated Production of Coal in Bulgaria, 1936-54 and 1957 . . . . .	49
11. Estimated Production of Coal in Rumania, 1936-55 . . . . .	52
12. Estimated Production of Lignite in Albania, 1936-55 . . . . .	53

Map

Bulgaria, Rumania, and Albania: Coal Deposits . . . . .	Inside Back Cover
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CIA/RR 57  
(ORR Project 26.200)

S-E-C-R-E-T

SOLID FUELS AND COAL GAS  
IN BULGARIA, RUMANIA, AND ALBANIA\*

Summary

Bulgaria.

Coal is the major source of primary energy in Bulgaria. In 1954, coal furnished about 81 percent of the total energy supply. Fuelwood furnished approximately 17 percent, and petroleum and hydroelectric power combined furnished approximately 2 percent.

The postwar trend of Bulgarian economy from agricultural to industrial is reflected in the increased annual coal production, which gained each year from a postwar low of 3.5 million metric tons\*\* in 1946 to a high of 8.8 million tons in 1954. A goal of 14 million tons has been planned for 1957, but it is estimated that production will fall short of this amount by approximately 3 million tons.

Bulgaria is a net exporter of coal but on a very small scale, and imports of coal have been negligible. About 34 percent of the total coal produced currently is consumed by the railroads, 25 percent by thermal electric power plants, and 2 percent in the manufacture of briquettes. The remaining 39 percent includes exports and local consumption by cement, brick, coke, and other miscellaneous industries and by home consumers.

Reserves of coal are adequate, and volume of production is considered to be limited only by available operating mine capacity. Although Soviet mining methods and equipment have been introduced, they are being used only on a very limited scale, and technical difficulties and extremely high labor turnover will delay the attainment of further substantial production increases.

\* The estimates and conclusions contained in this report represent the best judgment of ORR as of 7 February 1955.

\*\* Throughout this report, tonnages are given in metric tons.

S-E-C-R-E-T



S-E-C-R-E-T

The growth of fuelwood production has almost paralleled that of coal production. From an estimated 3 million cubic meters (cu m) in 1946, production rose to an estimated 7.25 million cubic meters in 1954. Fuelwood is used primarily for space heating. Imports and exports of fuelwood are believed to be negligible. Production of other solid fuels of minor importance include gas coke -- less than 20,000 tons annually -- and fuel briquettes -- approximately 225,000 tons in 1953.

Rumania.

Coal represented about 15.5 percent of the total energy produced from primary sources in Rumania in 1954. Because of large exports of petroleum, however, coal accounted for about 27 percent of the total indigenous energy consumed in Rumania in that year.

The solid fuels industry of Rumania has acquired prominence since World War II. In establishing extremely high 1955 goals for electric power, metallurgical, and other industries, the Five Year Plan (1951-55) placed great emphasis upon substantial increases in the supply of solid fuels from indigenous sources. This added emphasis on the supply of coal and coke is reflected in production increases, which -- although significant -- are too small to meet 1955 goals without drastic improvement.

Production of coal in Rumania has increased from about 2 million tons in 1946 to about 5 million tons in 1954. Nationalization of the mines and the introduction of Soviet equipment, mining methods, and labor practices contributed substantially to this increase. There is every indication, however, that even with Soviet assistance, 1955 production will fall short of the 8.5-million-ton goal planned for that year by 2 million or 3 million tons.

Rumania is self-sufficient in all types of coal except hard coal.\* It is especially short of coking coal, and for much of this coal it must depend upon other sources of supply, principally Poland and the USSR. Hard coal reserves (anthracite and bituminous coals combined) total 31 million tons -- sufficient for about 60 years at the current rate of extraction. Reserves of brown coal and lignite combined total

\* In this report the term hard coal is used in the European sense and includes both anthracite and bituminous coals.

S-E-C-R-E-T

2.8 billion tons -- sufficient at the current rate of production for several hundred years.

Railroads are estimated to consume about 60 percent of the indigenous production of coal in Rumania; thermal electric power stations, 13.7 percent; ferrous metals industries, 5.6 percent; home use, 6.1 percent; and other industries, 14.6 percent.

Supply of indigenous coals for coking quality, and facilities for coking it, are insufficient for the metallurgical coke needs of Rumania's iron and steel industry. New coking facilities are under construction. In the interim, additional supplies of coking coal and metallurgical coke are being imported from Poland and the USSR. The Five Year Plan envisages the making of metallurgical coke out of low-grade indigenous coals, but accomplishment of this seems to be extremely doubtful.

Production, consumption, and reserves of fuelwood have decreased since the end of the war. Production in 1954 is estimated at 7 million cu m, whereas it had been 12 million cu m in 1946. Fuelwood is still an important domestic fuel, although use of natural gas and coal has increased since the war.

Estimated production of fuel briquettes for 1953 is 260,000 tons, probably used entirely for domestic purposes.

Albania.

In 1954, solid fuels furnished about 57.1 percent of the total energy produced from primary sources in Albania. Of this amount, fuelwood accounted for 39.6 percent and lignite for 17.5 percent. Petroleum is the chief primary source of energy, supplying 42.7 percent of the total, whereas hydroelectric power supplied only 0.2 percent.

All coal produced in Albania is believed to be lignite. Since 1938, when only 4,000 tons were produced, production has increased to 303,000 tons in 1954. In the Plan for 1955 a goal of 404,000 tons was set.

Because of poor transportation facilities, lignite production is consumed almost wholly in the areas of production. No quantitative breakdown of consumers by type is possible, but small industrial

S-E-C-R-E-T

plants, railroad locomotives, thermal electric power plants,\* and household uses accounted for most of the production in 1954.

Small tonnages of hard coal and coke are imported from Poland. The bulk of these imports is consumed in the vicinity of the ports of Durres and Vlone.

Albania has reserves of lignite sufficient to support further increases in production, but any major increase would probably require the importation of mining machinery, principally from the USSR.

Fuelwood production in 1954 is estimated at 1.85 million cubic meters -- equivalent to about 344,000 tons in terms of standard fuel equivalent. It is believed that reserves are sufficient to maintain this rate of production for many years. It is consumed largely for space heating, for household heat, and for heat and power in small industrial plants in the rural districts back from the coastal plain.

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\* About 28 percent of the indigenous and imported coal supply in 1953 was used by thermal electric power plants.

S-E-C-R-E-T

I. Bulgaria.

A. Introduction.

The major source of primary energy in Bulgaria in 1954 was coal, which furnished approximately 81 percent of the total supply of primary energy. Fuelwood furnished 17 percent of the total, and hydroelectric power furnished an estimated 1 percent. Bulgaria has a small production of petroleum or natural gas and must import petroleum products. There are peat deposits and several large oil shale deposits in the country, but no production has been reported, and it is assumed that none has occurred. The estimated balance of sources of primary energy in Bulgaria, 1954, is given in Table 1.\*

Four types of coal are produced in Bulgaria. Two of them, referred to in this report as anthracite and bituminous coal, may be classified together as hard coal. The other two types are brown coal and lignite, sometimes referred to together as brown coals -- as they are in East Germany -- and at other times mentioned independently.

B. Coal.

1. General.

Production of coal in Bulgaria was at the 2-million-ton level in 1938. It is believed that during World War II the Germans forced Bulgaria to supply considerable coal to other countries under their domination. Production rose to slightly more than 4 million tons in 1943 -- the peak production until 1947.

The relatively low level of production of coal in the past reflects, to a considerable degree, the low status of Bulgarian industrialization.

Bulgaria has a population of about 7 million, and the economy has always been predominantly agricultural. Great efforts were made, however, to industrialize during the 1949-53 and 1954-58 Five Year Plans. Coal is vital to the program and, because production has been lagging behind demand, has received considerable attention from the government.

\* Table 1 follows on p. 6.

Table 1

Estimated Balance of Sources of Primary Energy Produced in Bulgaria a/  
1954

Source of Energy	Production		Standard Fuel Equivalent b/ (Thousand Metric Tons)	Percent of Total
	Unit	Amount		
Coal				
Hard	Thousand metric tons	440 c/	440	5.6
Brown	Thousand metric tons	8,364 d/	5,943	75.3
Petroleum	Thousand metric tons	50 e/	71	0.9
Fuelwood	Thousand cubic meters	7,250 f/	1,346	17.0
Hydroelectric power	Million kilowatt-hours	800 g/	98	1.2
Total			7,898	100.0

a. All energy balances in this report were developed by converting the units of production of each fuel to kilocalories, and then to tons of standard fuel equivalent on the basis of 7 million kilocalories per ton of standard fuel (or, as it is more commonly expressed, 7,000 kilocalories per kilogram).

b. Standard fuel equivalent of 7,000 kilocalories per kilogram.

c. Average heat value of 7,000 kilocalories per kilogram.

d. Average estimated heat value of 5,500 kilocalories per kilogram for brown coal and 3,500 kilocalories per kilogram for lignite. It is estimated that approximately 70 percent of total coal produced was brown coal, and 25 percent of total coal produced was lignite.

e. Average heat value of 10,000 kilocalories per kilogram.

f. Average heat value of 1.3 million kilocalories per cu m.

g. Average heat value of 860 kilocalories per kilowatt-hour and an estimated hydroelectric power production of approximately 42 percent of total kilowatt-hour production in 1953.

S-E-C-R-E-T

2. Organization.

During World War II, all mining operations in Bulgaria were controlled by the government, although not all of the concessions were state-owned. The largest mines, the Pernik (now called Dimitrovo) brown coal mines, however, were owned and operated by the state as were the lignite mines of Bobov Dol and three of the anthracite mines. All other mines were privately owned. 1/\*

There is little information available about the organization of the coal mining industry in Bulgaria since World War II. It is believed that the entire industry is nationalized and controlled by the Ministry of Heavy Industry; that production and management directives are handed down from a central planning board which operates under close Soviet supervision; and that key positions are, as is usual in Satellite nations, held by strong Communist party members.

3. Production.

All the anthracite and bituminous coal produced in Bulgaria originates in the area northwest and west of Sofia, with the exception of some bituminous coal which is produced in the Balkan Basin. The highest pre-World War II production of anthracite and bituminous coal was attained in 1939, when approximately 6,000 and 158,000 tons, respectively, were produced. 2/ It is estimated that in 1954 the production of anthracite coal was 57,000 tons and of bituminous coal, 383,000 tons.

The most important area of production of brown coal is in the vicinity of Sofia at Dimitrovo. Other areas of production are south and northwest of Sofia, near Bobov Dol and Vrushka Chuka, respectively; the Balkan Basin, near Nikolaeva; the Maritsa River Valley (sometimes referred to as the Marbas), near Dimitrovgrad and Merichleri; and the Bulgarian Black Sea coast, near the port of Burgas (Cherno More Mine). The pre-World War II peak production of brown coal and lignite in Bulgaria was 2.1 million tons, of which the Dimitrovo mines produced about 82 percent, 1.7 million tons. 3/ During World War II, production of brown coal and lignite continued to rise and reached its highest level in 1943, when an estimated 3.9 million tons were produced. About 80 percent of this quantity was Dimitrovo brown coal. 4/

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S-E-C-R-E-T

Since World War II the production of coal has steadily increased, except in 1946 when a slight regression occurred -- 3.5 million tons in 1946 compared with 3.6 million tons in 1945. Under the impetus of the Two Year Plan (1947-48) considerable progress was made, but in neither year was the Plan fulfilled.

Under the First Five Year Plan, emphasis in the coal industry was placed mainly on the development of a new lignite area and the continued mechanization of the Dimitrovo Basin, which produces brown coal. Production of coal rose rapidly, and official statements claimed the achievement of the originally planned 1953 goals by October 1952. In fact, production of 7.4 million tons of coal in 1952 surpassed original planned production for that year of 6.9 million tons. Although production reached an estimated 8.8 million tons in 1954, it fell short of planned production by about 150,000 tons. It is estimated that Bulgaria will fail to meet its 1957 goal of 14 million tons by about 3 million tons. The estimated production of coal in Bulgaria, 1950-54, is shown in Table 2.\* See also Appendix A, Table 10,\*\* for 1936-54 and 1957 production.

No complete data on production of individual types of coal have been received in recent years. [redacted]

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[redacted] the portion of the total constituted by brown coal has decreased and that of the inferior type of coal, lignite, has risen proportionately. In 1939, 90 percent of total production of coal was brown coal, the largest portion of which was Dimitrovo coal, whereas in 1950, less than 70 percent of total production of coal was brown coal. Production of lignite, however, increased from 4.2 percent in 1939 to 25 percent of total production of coal in 1950, of which a large portion was Marbas coal. 5/

4. Foreign Trade.

Bulgaria is a net exporter of coal, although on a very small scale. There are no imports of solid fuels, and only minor quantities of coal are exported.

\* Table 2 follows on p. 9.

\*\* P. 49, below.

S-E-C-R-E-T

Table 2

Estimated Production of Coal in Bulgaria  
1950-54 and 1957

Year	Thousand Metric Tons			
	Hard Coal <u>a/</u>	Brown Coal <u>b/</u>	Total	Plan
1950	220 <u>c/</u>	5,603 <u>d/</u>	5,823 <u>e/</u>	6,021 <u>f/</u>
1951	284 <u>g/</u>	6,026 <u>d/</u>	6,310 <u>h/</u>	7,267 <u>i/</u>
1952	348 <u>j/</u>	7,062 <u>d/</u>	7,410 <u>k/</u>	6,947 <u>l/</u>
1953	394 <u>m/</u>	7,834 <u>d/</u>	8,228 <u>n/</u>	8,477 <u>o/</u>
1954	440 <u>p/</u>	8,364 <u>a/</u>	8,804 <u>q/</u>	8,985 <u>r/</u>
1957	600 <u>p/</u>	10,800 <u>d/</u>	11,400 <u>s/</u>	14,000 <u>t/</u>

a. Hard coal includes anthracite and bituminous coal.

b. Brown coal includes lignite.

c. Based upon reported estimate of 200,000 tons of bituminous 6/ and a rough estimate of 20,000 tons of anthracite coal.

d. Residual.

e. 263 percent of 1939 production. 7/

f. 8/

g. By interpolation.

h. 285 percent of 1939 production. 9/

i. Production plan for 1951 reported at 124.8 percent of 1950 production. 10/

j. Estimated from data given in source 11/.

k. 12/

l. Production plan for 1952 was to be 110.1 percent of 1951 production. 13/

m. Hard coal production was 113 percent of 1952 production. 14/

n. 141.3 percent of 1950 production. 15/

o. Coal production in 1953 was to be increased 14.4 percent over the 1952 level. 16/

p. Projection of recent average annual trend.

q. During the first 7 months of 1954, 353,000 tons more coal were produced than during the same period of 1953. 17/ Projection to 12 months gives an increase of 576,000 tons over 1953 production.

r. Coal production was to increase 9.2 percent over 1953 production. 18/



S-E-C-R-E-T

Table 2

Estimated Production of Coal in Bulgaria  
1950-54 and 1957  
(Continued)

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s. Projected at the approximate 1951-54 rate of increase.

t. 19/

a. Imports.

There have been no reports that Bulgaria has imported any coal in recent years. The last figures available show total imports of 10,606 tons of coal for the 3-year period 1937-39, and all except 1,296 tons of this came from Germany. 20/

b. Exports.

Data for the 1937-39 period show exports of only 36,780 tons of coal, of which 31,969 tons, 87 percent, went to Yugoslavia and most of the balance to Greece. 21/ It was estimated that 100,000 tons were exported in 1942. 22/ The Germans evidently forced Bulgaria to provide coal to Yugoslavia, Italy, Hungary, and Greece during World War II.

Few Bulgarian trade statistics have been available in recent years. In August 1947, Bulgaria agreed to deliver to Yugoslavia 50,000 tons of coal by the end of February 1948. 23/ A trade agreement was signed with Egypt on 6 April 1950 calling for shipments of Bulgarian coal and coke to Egypt. 24/ In June 1950, Bulgaria agreed to ship 10,000 tons of anthracite and US \$100,000 worth (roughly equivalent to 5,000 tons) of pit coal to Austria. 25/ There have been a few references to exports of coal from certain mines to the USSR, and although there may have been some shipments a few years ago when the USSR was desperately short of coal, it is believed that any shipments were relatively small.

It is doubtful whether Bulgarian exports of coal have exceeded 150,000 tons annually since World War II, and it is believed that they have probably been much less than that figure during

S-E-C-R-E-T

the last few years. It is estimated that the current rate of exports is about 80,000 tons annually. 26/

5. Stocks.

There are no data available on coal stocks in Bulgaria, but it is believed that they are usually low. The better quality bituminous coal is always in short supply, and brown coal and lignite are not suitable for prolonged storage.

The distribution of coal, firewood, and charcoal, as well as all trade therein, was declared the monopoly of a state-autonomous enterprise, Toplivo (Fuel), on 9 July 1947. 27/ Yards operated by Toplivo were to hold a large part of the existing stocks.

6. Consumption.

There are little available data on requirements and consumption of coal in Bulgaria, and it is possible to furnish only estimates of the quantities that would probably be supplied to major categories of consumers.

The estimated consumption of coal in Bulgaria by major consuming sectors, 1950-54, is shown in Table 3.\* The figures for estimated consumption by various sectors have been derived from estimated and actual consumption by those sectors. In 1954 the percentages of available coal consumed by each sector were as follows: railroads, 34 percent; thermal electric power plants, 25 percent; briquette plants, 2 percent; and other users, 39 percent (other users include the cement, coke, brick, glass, and synthetic fuel industries and exports).

December 1949 stated that production at the Dimitrovo mines was between 10,500 and 13,000 tons daily. This coal was allocated as follows: 5,000 tons to the railroads and merchant marine; 1,000 tons to the power stations, glass factory, and metallurgical factory in Dimitrovo; 1,000 tons to several other power stations including TETS (Termichna Elektricheska Tsentrala -- Thermal Electric Plant) Nadezhda and TETS Kourilovo; 2,000 tons to Sofia for factories and heating; and the balance for general domestic use within Bulgaria. 28/ No recent consumption data have been received.

50X1

\* Table 3 follows on p. 12.

S-E-C-R-E-T

Table 3

Estimated Consumption of Coal in Bulgaria  
by Major Consuming Sector  
1950-54

Consumer	Thousand Metric Tons				
	1950	1951	1952	1953	1954
Railroads <u>a/</u>	1,890	2,233	2,478	2,758	3,038
Thermal electric power plants <u>b/</u>	911	1,285	1,698	1,952	2,166
Briquettes <u>c/</u>	150	150	150	150	150
Other users <u>d/</u>	2,872	2,642	3,084	3,368	3,479
Total	<u>5,823</u>	<u>6,310</u>	<u>7,410</u>	<u>8,228</u>	<u>8,833</u>

a. Estimated on the basis of 700 grams per ton-kilometer and the following ton-kilometer achievements: 1950, 2.7 billion; 1951, 3.19 billion; 1952, 3.54 billion; 1953, 3.94 billion; 29/ and 1954, 4.34 billion.

b. Estimated on the basis of 2.29 kilograms of coal per kilowatt-hour and the following percentage of total kilowatt-hour production originating in thermal electric power plants in the years in question: 1950, 51 percent of 780 million kilowatt-hours; 1951, 55 percent of 1,020 million kilowatt-hours; 1952, 55 percent of 1,348 million kilowatt-hours 30/; 1953, 55 percent of 1,550 million kilowatt-hours 31/; and 1954, 55 percent of 1,720 million kilowatt-hours.

c. Estimated unchanging input because of probable lack of any new capacity.

d. Residual figure, including domestic consumption and exports.

7. Reserves.

The Bulgarian Directorate of Mines released the estimates of coal reserves in 1947. 32/ These estimated reserves of coal in Bulgaria are shown in Table 4.\*

\* Table 4 follows on p. 13.

S-E-C-R-E-T

Table 4  
Estimated Reserves of Coal in Bulgaria  
1947

<u>Type of Coal</u>	<u>Quantity</u> <u>(Million Metric Tons)</u>	<u>Percent</u>
Lignite	1,575	87.99
Brown	185	10.33
Bituminous	15	0.84
Anthracite	15	0.84
Total	<u>1,790</u>	<u>100.0</u>

Assuming an estimated annual production in 1957 of 600,000 tons of hard coal, reserves should last for 50 years, and an annual production of 10.8 million tons of brown coal would indicate reserves of brown coal and lignite sufficient for nearly 170 years. According to information of April 1948, new lignite deposits, estimated at 120 to 150 million tons, were discovered on the left bank of the Maritsa River, not far from Dimitrovgrad. 33/ This would increase the duration of reserves by at least 13 years.

8. Deposits.

Deposits of the four types of coal mined in Bulgaria are located as follows:

- a. Anthracite -- in northwestern and western Bulgaria.
- b. Bituminous coal -- (1) in east-central Bulgaria (Balkan Basin), (2) near Belogradelisk (Vrushka Basin), and (3) southwest of Gorna Dzhumaya near the Yugoslav border (Souchosterel Basin).
- c. Brown coal -- (1) southwest of Sofia (Dimitrovo Basin), and (2) in southwest Bulgaria (Bobov Dol and Prinin Struma Basins).
- d. Lignite -- (1) in central Bulgaria (Maritsa Basin), (2) at Nikolaevo (Nikolaevo Basin), and (3) on the Bulgarian Black Sea coast (Burgas Basin).

S-E-C-R-E-T

Further information on these basins may be found in Appendix B and on the accompanying map.\*

9. Technology.

a. Methods.

Both strip mining and deep mining methods are used in Bulgaria, but it is not known in what proportion. It is believed that the only two strip mines of any size are the Republica and the 7 September Mines in the Dimitrovo Basin. Soviet methods and machinery have been introduced into Bulgarian mines, but it is not known to what extent.

b. Equipment.

Although mechanization in some Bulgarian coal mines has been emphasized since the advent of the Communist regime, it is believed that the results have been felt only in the large mines such as those at Dimitrovo, in the Maritsa Basin, and possibly at the Chernomore Mines (Burgas). As far as can be determined, no cutting machines were employed before 1951, and all underground extraction was by pick-and-shovel methods. As late as 1950, equipment and ventilation were poor, casualties were frequent, and coal transport was largely manual in the best mines in Bulgaria, in the Dimitrovo Basin. 34/ At the same time, the Chernomore Mines were using pre-World War II Belgian equipment which was badly worn. 35/

In 1950, however, a decree of the Council of Ministers announced a mechanization plan for the Georgi Dimitrov Mine at Dimitrovo. This plan entailed, among other things, 50-percent mechanization of the digging and loading processes, 100-percent mechanization of the hauling methods, and the installation of twenty-one 100-meter conveyor belts and 1 Donbas coal combine. This was to be accomplished by the end of 1953. 36/ By mid-1953, three coal cleaning plants were claimed to have been erected in the Dimitrovo, Maritsa, and Pirin areas, and excavators, loaders, electric shovels, and Donbas combines were in use. 37/ Some machinery was produced locally at the machine building plant at Dimitrovo, and in 1953, 100 pneumatic hammers were imported from the USSR. 38/ Other mining

\* Inside back cover.

S-E-C-R-E-T

equipment was claimed to have been received from the USSR, Czechoslovakia, and East Germany 39/ -- specifically the C-153 loading machine from the USSR 40/ and Skoda trucks from Czechoslovakia. 41/ The main drawbacks to the effective use of this equipment appear to be the mechanical ineptness and lack of enthusiasm of the mining personnel and the structural imperfections of the equipment. There have been complaints about frequent damage 42/ and about the lack and inefficiency of repair facilities. 43/

10. Labor.

Recent information indicates that the maintenance of an adequate labor force has been one of the pressing problems of the coal industry. In 1952 it was necessary for the Svoje anthracite mines, 44/ the Chernomore lignite mines, 45/ and the Georgi Dimitrov, Maritsa, Pirin, and Chumerna Mines 46/ to advertise for all ranks of mine personnel, from laborers to mine foremen. It was reported that during 1952 there were 15,000 prisoners from forced labor camps working at the Bobov Dol, Pirin, Chernomore, and Plachkovtsi Mines. 47/ Even Premier Chervenkov has found it necessary to make public comment on the fact that in the Georgi Dimitrov Mine in the Dimitrovo Basin, 10,000 out of a labor force of 10,644 were replaced during 1952.

It is difficult to estimate the present size of the labor force engaged in the Bulgarian coal mining industry. It is estimated that in 1947 there were from 19,000 to 20,000 workers at the principal mines. Mines in the Dimitrovo Basin alone are reported to have employed a total of from 14,700 to 15,700 workers. 48/ It is believed that by 1950 the Dimitrovo Basin mines had increased their staff to 16,000 and that there was some increase at the Maritsa Basin.

Poor working conditions as well as low wages have been the main causes of the labor turnover and have given rise to the necessity of hiring women and minors as well as of using political prisoners. It was reported that 200 women volunteered at Dimitrovo in 1950. 49/ Living conditions at Dimitrovo were no better for voluntary laborers than they were for prisoners, and many peasants left to return to their farms. 50/ According to official statements, the causes for dissatisfaction are partially attributable to lack of adequate Communist influence on the working levels, failure to introduce new working methods, and the lack of competitive work programs. Official

S-E-C-R-E-T

inducements for workers and engineers to volunteer at the mines, however, were offers of free land and building funds. 51/ All these conditions existed at the Dimitrovo mines, and do not necessarily hold for other smaller installations. Another attempt to increase the labor force in the coal mines is the requirement that all graduates of the School of Mining must work 3 years at coal or ore mining and all graduates who had left the coal mines were to be returned unless engaged in other underground work or defense work. 52/

There is little information available on actual real wages of the labor force in the coal mining industry. In early 1954, miners were one of the highest paid labor groups in Bulgaria. An ordinary miner's salary is quoted as from 900 to 1,600 leva per month, and a titled miner's salary as up to 2,000 leva per month. 53/ Some conception of the purchasing power of these salaries, however, may be gained from the following late 1953 prices 54/:

<u>Commodity</u>	<u>Price</u>
Black bread	1.70 leva per kilogram
Meat	13.00 to 15.00 leva per kilogram
Soap	4.00 to 8.00 leva per kilogram
Man's ready-made woolen suit	450.00 to 600.00 leva
Men's shoes	240.00 leva

C. Fuel Briquettes.

in 1948, there were 3 briquette plants in operation in Bulgaria at that time -- 1 in Dimitrovo, 55/ at the Pirin Mine near Brezhani, 56/ and 1 in the Maritsa Basin. 57/

50X1

Annual production of fuel briquettes is estimated to be 200,000 tons in 1950 and 1951, and 225,000 tons in 1952 and 1953. 58/ It is believed that the entire production of briquettes in Bulgaria is consumed locally as domestic fuel.

S-E-C-R-E-T

D. Coke.

1. Production.

The coke industry of Bulgaria is exceedingly small. One coke plant, located in Plachkovtsi, produced from 6,000 to 8,000 tons 59/ of gas coke. The coal input is from the Prince Boris Mine in the Balkan Basin. 60/ This Plachkovtsi coke plant is reported to consist of 2 batteries of 11 ovens each. Another coke plant of about the same size is located at Kazanlik. 61/ Total annual coke output is believed to be less than 20,000 tons. 62/

2. Imports.

Current production of coke is not sufficient for all needs. Mention was made in the Polish-Bulgarian trade agreement signed 11 July 1951 and extending into 1953 that Poland would furnish coke to Bulgaria. 63/ There are no data concerning the amount of such imports, but they are believed to be minor.

3. Consumption.

It is believed that imported metallurgical coke is used primarily in copper smelting and iron and steel foundaries, and that gas coke is used by miscellaneous small industries. Charcoal is used instead of coke at the carbide factory in Iliyantsi. 64/ There are no blast furnaces making pig iron.

E. Fuelwood.

1. Production.

It has been reported that 5.2 million cu m of timber were felled in 1948 of which 3.7 million cu m were fuelwood. It was planned that at the end of the Five Year Plan the output of fuelwood was to increase to 7.4 million cu m, or 100 percent more than in 1948. 65/ It is estimated that the 1953 goal for production of fuelwood was surpassed by 100,000 cu m. Production of fuelwood in millions of cu m of roundwood is estimated as follows\*: 3 million in 1946, 5 million in 1950, 6 million in 1951, 6.9 million in 1952, and 7.2 million in 1954.

\* Estimates of the production of fuelwood include planned and local gathering. The unit measure is a cu m of solid wood content and not a stacked measure.



S-E-C-R-E-T

2. Consumption.

In Bulgaria, fuelwood is an important substitute for space heating. Annual production may be considered as approximately equivalent to consumption. It is believed that imports or exports of fuelwood, if any, are negligible.

F. Capabilities, Vulnerabilities, and Intentions.

1. Capabilities.

On the basis of experience to date under the Two Year Plan and the First Five Year Plan, it seems reasonable to assume that the 1954 goal of an estimated 9 million tons of coal can be met. Of much more significance to the industrial development of Bulgaria will be the attainment of the 1957 goal of about 14 million tons under the Second Five Year Plan. Even under the most favorable conditions, however, it is doubted that such a level of production will be met. Such a goal would require an average annual increase of 1.8 million tons in 1955, 1956, and 1957, an increment much higher than any annual increase to date. It is estimated that Bulgaria will fail to meet the 1957 coal production goal by about 3 million tons.

2. Vulnerabilities.

The principal vulnerability of Bulgaria's coal industry is the unstable labor force. The burden of additional production has been placed on a new labor force, traditionally agricultural, which has no desire to remain permanently in the mines. Another vulnerability is in the transportation of coal from the mines to the consumers.

3. Intentions.

Although contributing to the military potential of Bulgaria, the aforementioned increases, improvements, and investments can not be considered indications of warlike or political intentions and are merely indicative of their intent to become as self-sufficient as possible in the Bulgarian industrialization process.

S-E-C-R-E-T

II. Rumania.

A. Introduction.

In 1954, production of coal represented only 15.5 percent of the total energy produced from primary sources in Rumania. Petroleum is by far the most important source of energy, supplying 62.5 percent of the total production. Natural gas ranks second in supplying 16.4 percent of the total energy produced. The estimated balance of sources of primary energy produced in Rumania, 1954, is shown in Table 5.\*

The part played by coal in the internal development of the industrial and domestic economy of Rumania assumes greater importance, however, since approximately two-thirds of the petroleum production is exported. On this basis, coal provided about 27 percent of the indigenous energy consumed in Rumania in 1954.

Four types of coal are found in Rumania. The most abundant type is brown coal, followed in order by lignite, bituminous, and anthracite. Except for a few years, the available data group bituminous and anthracite coal together, and brown coal and lignite. These groupings are generally used in this report.

B. Coal.

1. General.

a. History.

Until the mid-1930's the development of the coal industry in Rumania was retarded because of the industrial backwardness of the country and the abundant supplies of petroleum and fuelwood. During the years immediately preceding World War II, coal began to receive more attention as a source of energy for the expanding industry of Rumania. Since 1946, coal production has more than doubled.

\* Table 5 follows on p. 20.

Table 5

Estimated Balance of Sources of Primary Energy Produced in Rumania  
1954

Source of Energy	Production		Standard Fuel Equivalent <u>a/</u> (Thousand Metric Tons)	Percent of Total
	Unit	Amount		
Coal				
Hard	Thousand metric tons	450 <u>b/</u>	450	1.8
Brown	Thousand metric tons	4,550 <u>c/</u>	3,299	13.7
Petroleum	Thousand metric tons	10,500 <u>d/</u>	15,000	62.5
Natural gas	Million cubic meters	4,400 <u>e/</u>	3,950	16.4
Fuelwood	Thousand cubic meters	7,000 <u>f/</u>	1,300	5.4
Hydroelectric power	Million kilowatt-hours	700 <u>g/</u>	86	0.2
Total			<u>24,085</u>	<u>100.0</u>

a. Standard fuel equivalent of 7,000 kilocalories per kilogram.

b. Average heat value of 7,000 kilocalories per kilogram. 66/

c. Average heat value of 5,076 kilocalories per kilogram (1947 production breakdown applied to 5,500 and 3,500 kilocalories per kilogram for brown coal and lignite respectively). 67/

d. Average heat value of 10,000 kilocalories per kilogram. 68/

e. Average heat value of 7,900 kilocalories per kilogram. Basis: 60 percent dry methane gas at 9,500 kilocalories per kilogram and 40 percent wet petroleum gas at 5,500 kilocalories per kilogram. 69/

f. Average heat value of 1,300,000 kilocalories per cu m.

g. Average heat value of 860 kilocalories per kilowatt-hour. 70/ It is estimated that 14 percent of total production of 3,410 million kilowatt-hours is hydroelectric power.

S-E-C-R-E-T

b. Organization.

(1) Pre-World War II. 71/

In 1935 there were approximately 28 private companies engaged in the production and marketing of coal. Seven of these companies controlled 89 percent of the total production of all types of coal.

(2) Post-World War II.

After the collapse of the Groza government in 1945 and the emergence of a Communist regime, a trade agreement was signed between the USSR and Rumania on 8 May 1945, by which were established 14 Sovroms, or Soviet-Rumanian joint companies. 72/ One of these joint companies was known as Sovromcarbune (Soviet-Rumanian Joint Coal Company) and was set up to control 70 percent of all Rumanian coal production.\* 73/ The ostensible purpose of these organizations was to direct Rumanian raw materials into Satellite and Soviet channels and in return to make available credit, other raw materials, and Soviet technology in order to increase the productivity of Rumania. 74/ It is believed that, at the time of its creation, the Sovromcarbune appropriated the holdings of the Petrosani, Recita, and Creditul Carbonifere, and about nine other companies -- in other words, the most important producers.

Simultaneously with the establishment of Sovromcarbune, a group of about 15 other regions was combined under a state enterprise known as Carbonifere, later placed under the General Directorate of Coal. According to a press release of March 1951, all coal mining became an integral part of the nationalized economy, under the jurisdiction of the Ministry of Mines and Petroleum. 75/ In April 1951 the name of the Ministry was changed to the Ministry of Petroleum and Coal, and the principle was established that the distribution of its products should be according to a plan acceptable to and confirmed by the State Commission for Supply. 76/

On 26 August 1953 it was reported that the Ministry of Petroleum and Coal had been divided into the Ministry of Petroleum and Natural Gas Industries and the Ministry of Coal Industry. 77/

\* Dissolution of 12 Sovroms, including Sovromcarbune, was announced on 25 September 1954 by the Rumanian press.

S-E-C-R-E-T

2. Supply.

a. Production.

The estimated 1954 production of 5 million tons of coal in Rumania is an all-time high. Although detailed information is not available, it is believed that the production of each type of coal is at a record level.

In 1938, total coal production was 2.4 million tons, of which 2.1 million tons, or 87.5 percent, was brown coal and lignite, and the remaining 0.3 million tons, or 12.5 percent, was anthracite and bituminous coal. The year 1943 marked a new peak when total production reached 2.9 million tons. All but a few thousand tons of the increase over 1938 was in brown coal and lignite.

Production then declined to prewar levels and reached a low of 2 million tons in 1946, after which it increased to a new high of 3.2 million tons in 1950. In this latter year it is interesting to note that the anthracite and bituminous output was at practically the same level as in 1938, but represented only 9.4 percent of total production in 1950. The estimated production of coal in Rumania, 1950-55, is shown in Table 6.\* See also Appendix A, Table 11,\*\* for production, 1936-55.

The First Five Year Plan envisages a total coal production of 8.5 million tons in 1955. This would require an incremental increase in total production in both 1954 and 1955 of more than 2 million tons. During the 7 years preceding 1954 the average annual increase was about 360,000 tons, and the maximum annual increase was about 575,000 tons. Allowing for increases in mechanization, the development of new mines, higher productivity, and more equipment and technical assistance from the USSR, it is estimated that 1955 production will fall short of the goal by 2 or 3 million tons.

b. Imports.

Rumania is self-sufficient in all types of coal except hard coal. It is particularly short of coking coal -- for much of this type of coal it depends upon Poland and the USSR.

\* Table 6 follows on p. 23.

\*\* P. 52, below.

S-E-C-R-E-T

Table 6  
Estimated Production of Coal in Rumania  
1950-55

Thousand Metric Tons				
<u>Year</u>	<u>Hard Coal a/</u>	<u>Brown Coal b/</u>	<u>Total</u>	<u>Planned</u>
1950 <u>c/</u>	300	2,900	3,200	
1951	340 <u>d/</u>	3,433 <u>d/</u>	3,773 <u>d/</u>	4,006 <u>e/</u>
1952	381 <u>f/</u>	3,856 <u>f/</u>	4,237 <u>f/</u>	4,355 <u>g/</u>
1953	400 <u>h/</u>	4,049 <u>h/</u>	4,449 <u>h/</u>	4,695 <u>i/</u>
1954	450 <u>j/</u>	4,550 <u>j/</u>	5,000 <u>j/</u>	N.A.
1955	500 <u>j/</u>	5,100 <u>j/</u>	5,600 <u>j/</u>	8,500 <u>k/</u>

a. Hard coal includes anthracite and bituminous coal.

b. Brown coal includes lignite.

c. 78/

d. 117.9 percent of 1950 production 79/ applied to total and separated into hard coal and brown coal according to respective percentages, 9 and 91, in 1950 and in the 1955 plan.

e. 125.2 percent of 1950 production. 80/

f. 112.3 percent of 1951 production 81/ applied as in note a, above.

g. 1952 production plan fulfilled 97.3 percent 82/ (equivalent to 115.4 percent of 1951 production).

h. 105 percent of 1952 production. 83/

i. 1953 production plan fulfilled by 94.8 percent 84/ (equivalent to 110.8 percent of 1952 production).

j. Estimate based on recent trends.

k. 85/

It was indicated that 200,000 tons of hard coal were imported in 1948, of which 60,000 tons came from Poland. The remainder was the quantity agreed upon by a trade protocol between the USSR and Rumania. 86/

S-E-C-R-E-T

Only a few figures have been reported which give any indication as to the quantities of coal which have been imported into Rumania since 1948. Import agreements in 1949 between Rumania and Poland for 30,000 tons of coal 87/ and between Rumania and the USSR for 360,000 tons 88/ have been reported, but actual shipment or receipt of the coal has not been confirmed. An agreement for imports amounting to 250,000 tons of coal from the USSR was also reached for 1950, 89/ but no firm figures for this year are available. One report states that in 1950 approximately 100,000 tons of coal and coke (of which an estimated 70,000 tons were coal) were imported through Dornesti, and the same quantity was planned for 1951. 90/ This report further states that the coal came from Poland by way of the USSR for Rumanian iron works and heavy industries at Hunedoara, Recita, Nadrag, Ferdinand, and Bucharest.

Because of the expansion of the ferrous metals industries and the limited supply of indigenous coking coal, it is believed that imports of this type of coal will increase annually for the next several years.

c. Exports.

Rumania is self-sufficient in production and reserves of brown coal and lignite, but these types of coal, because of high moisture and ash content and relatively low heating value, cannot be transported economically or exported competitively.

Rumania is a net importer of coal because of its limited supply of anthracite and bituminous coal. Although there is no information available on the subject, it is believed that the country does not export coal.

d. Stocks.

There is no information concerning the status of industrial or domestic coal stocks in Rumania. Because the bulk of the coal mined is brown coal or lignite, neither of which can stand prolonged storage, it is assumed that only working stocks are maintained.

S-E-C-R-E-T

3. Consumption.

There is little accurate or detailed information concerning the use of Rumanian coal by the various segments of Rumanian industry.

The Rumanian railroads continue to consume the largest quantities of coal, although there has been a steady decrease in the proportion which they consume of total production from 85 percent in 1937 91/ to 70 percent in 1944 92/ and to 63 percent in 1946. 93/ It is estimated that 1953 consumption by the railroads is at a level of about 2.7 million tons, or 60 percent of total coal production.

Thermal electric power stations in Rumania consumed an estimated 609,000 tons of coal in 1953, or 13.7 percent of total production. This estimate is based upon information that 13.7 percent of total electric power in 1950 was produced with waste and low-grade fuel, and 6.1 percent of the total was produced with high-grade fuel. 94/ There is a reference to the proposed use of refuse of washed coal (for a planned coking plant) in a thermal electric power plant in the Jiul Valley. 95/ Low-grade coal probably includes lignite and the poorer grades of brown coal, and high-grade coal for power generation is believed to include the high-grade brown coals or sub-bituminous coal. The estimated consumption of coal produced in Rumania, 1953, is shown in Table 7.\*

The Five Year Plan provides for the construction of seven new thermal electric power plants based on coal. 96/ Two of these plants are reported to have been in operation since August 1952. 97/ Under this Plan the use of high-grade fuels, such as petroleum products, will decrease from 93 percent of the total in 1950 to 57.6 percent in 1955, with a corresponding increase in the use of lower grade fuels, such as lignite and brown coal, from 7 percent of the total in 1950 to 42.4 percent in 1955. 98/

The Rumanian ferrous metals industry is reported to have consumed the country's entire output of anthracite and bituminous coal in 1944. 99/ Hard coals are essential to the operation of the ferrous metals industry, and since the end of World War II, consumption of hard coal in this industry has increased from approximately 162,000 tons in 1947 100/ to an estimated 250,000 tons in 1953, representing in the latter year, 5.6 percent of total consumption.

\* Table 7 follows on p. 26.



S-E-C-R-E-T

Table 7

Estimated Consumption of Coal Produced in Rumania a/  
1953

Consumer	Consumption	
	Thousand Metric Tons	Percent of Total
Railroads	2,669	60.0 <u>b/</u>
Thermal electric power stations	609 <u>c/</u>	13.7
Ferrous metals industries	250 <u>d/</u>	5.6
Domestic	271	6.1 <u>e/</u>
Other industries	650 <u>f/</u>	14.6
Total	<u>4,449</u>	<u>100.0</u>

- a. Excluding imports of coking coal, which are unknown.
- b. This estimate is based on trends. Consumption of coal by railroads in percentage of total coal produced was 85 percent in 1937, 101/ 70 percent in 1944, 102/ and 63 percent in 1946. 103/
- c. Total power is estimated to be 3,410 million kilowatt-hours, of which 13.7 percent is produced from "waste and low-grade" coal, 6.1 percent from "high-grade" (probably sub-bituminous) coal, 104/ and 1 kilowatt-hour is estimated equivalent to 1 kilogram of "waste or low-grade" coal or 0.68 kilograms of "high-grade" coal.
- d. This figure represents 75 percent of Rumanian production of bituminous coal. 105/
- e. Based on statement that 8.7 percent of total Rumanian production of brown coal was consumed as domestic fuel. 106/ Brown coal is estimated to represent 70 percent of total Rumanian production in 1953.
- f. Residual.

S-E-C-R-E-T

Little is known of current domestic consumption of coal in Rumania. It has been reported that domestic consumption in 1947 amounted to 8.7 percent of total production of Rumanian brown coal. 107/ At this rate, 271,000 tons of coal would have been consumed domestically in 1953. Recent government rules and regulations indicate that there are domestic fuel shortages. 108/

There is no current information on the importation of coal. On the basis of past experience, it is believed that most of the imported coal is of coking quality for use by the ferrous metals industry.

4. Deposits, Reserves, and Quality. 109/

a. Anthracite and Bituminous Coal.

Rumanian anthracite deposits are small and are confined to a limited area in the vicinity of Schela, Gorj regiune. There is one mine in the district, the Costa Rea, and there is no record of anthracite production at any other Rumanian mine.

The important deposits of bituminous coal in Rumania are found in the regiunes of Severin and Stalin, located respectively in Western and Central Rumania. The western regiune contains the Sekul, Doman, Lupac, and Anina mines in the vicinity of Recita. Of these, only the first produces coal of coking quality. Smaller deposits of bituminous coal are located in Hunedoara regiune at Deva, and in Severin regiune at Bigar south of Recita near the Yugoslav-Rumanian border.

Combined reserves of anthracite and bituminous coal as estimated in 1939 were 7 million tons of known reserves and 24 million tons of probable reserves, or a total of 31 million tons. Based on an average annual recovery of 500,000 tons of anthracite and bituminous coal estimated for 1955, about 60 years' duration of supplies may be expected from that date.

b. Brown Coal and Lignite.

Brown coal, the most abundant type of coal mined in Rumania, is found in the regiunes of Bacau, Severin, Hunedoara, and Cluj. The most important of these deposits is that of the Jiul river valley (8 mines) in the regiune of Hunedoara, where approximately 77 percent of total brown coal production was obtained in

S-E-C-R-E-T

1938. The area second in importance at that time was the Bacau regiune (3 mines), which produced 12 percent of the total, and third in importance was the Cluj regiune deposit (5 mines), where 6 percent of the Rumanian brown coal was produced. 110/

Lignite deposits are found to the south of the brown coal areas in lower-lying areas of the Transylvanian Mountains and in the western foothills of the Carpathian Mountains. The producing regiunes are Arges, Prahova, Buzau, and Bihor, in that order of importance.

Combined reserves of brown coal and lignite as calculated in 1939 were 717 million tons of known reserves with a probable reserve of 2.122 billion tons. This was a total of 2.839 billion tons.

Based on present and past production, or on future planned production, these reserves will probably last several hundred years.

5. Technology.

a. General.

It is believed that all anthracite, bituminous, and brown coals are mined from underground workings. Lignite is mined from underground workings, but it is also strip mined. Until recent years, in Rumania the various types of mining were generally performed by primitive methods and equipment.

b. Mechanization.

The demands of World War II and Rumanian plans to improve the economic position of the country in postwar years gave impetus to the mechanization of coal mines.

According to the Five Year Plan, the percentage of mechanization is to increase as follows in Sovromcarbune mines: cutting, from 93 percent in 1950 to 97 percent in 1955; transportation from faces, from 62 to 79 percent; underground transportation, from 80 to 84 percent; and transportation to surface, from 96 to 97 percent. For the

S-E-C-R-E-T

General Directorate of Coal, the increases for this period will be as follows: mechanization in drifts, from 5 percent in 1950 to 37 percent in 1955; transportation from face, from 20 to 72 percent; underground transportation, from 40 to 80 percent; and transportation to surface, from 92 to 98 percent. 111/ The increases shown for the latter group of mines indicate the low degree of mechanization as late as 1950.

Particularly noticeable in the available information is the lack of reference to accomplishments in the mechanical loading of coal at the face. This operation is possible only under certain natural conditions and carefully controlled auxiliary operations. Mechanical loading at the face presents the greatest opportunities for increasing productivity in coal mines. At the Luperic Mine in the Jiul Valley a Donbas coal mining combine\* was put into operation on 25 August 1952 and is reported to be the first machine of this type to have come from the USSR. 112/ A statement issued as late as 29 June 1954 indicates that the Donbas combine is still undergoing "adaptation tests." 113/ Other loading machines are reported to be in operation, but no data on numbers of machines or on the tonnages of mechanically loaded coal are available.

Most of the mining equipment of Rumania has been supplied in recent years by the USSR. This equipment includes modern combines, loaders, locomotives, conveyors, ventilators, drills, and mine lamps. Rumania is already building the less complicated types of equipment, such as drills, picks, compressors, and conveyors. During the present Five Year Plan, Rumania hopes to receive from the USSR hundreds of scraper conveyors and loading machines, dozens of extracting machines and locomotives, and hundreds of winches and coal cars. 114/

Other innovations reported are the use of diesel locomotives in certain underground mines, the use of coal-cutting machines in lignite mines, and the use of metal props and metal shields. 115/

\* The Donbas combine, developed in the USSR, is a coal-mining machine of the continuous type; that is, it performs the separate tasks of cutting, breaking down, and loading coal in a single continuous operation.

S-E-C-R-E-T

c. Preparation.

Brown coal and lignite, which are the principal coals mined in Rumania, require extensive cleaning to reduce the high ash and sulfur content and drying to reduce the high moisture content. Underground mechanization usually increases the amount of impurities in the coal and thus requires more efficient and higher capacity cleaning plants. Coal-processing plants at the Lupeni and Petrila Mines were to be expanded in 1951, and two new drying plants for lignite were to be in operation in the latter half of 1951 at the Filipestii-de-Padure and Derna-Voevogi Mines. 116/ Undoubtedly the expansion of coal-processing plant capacity has followed and will follow the upward trend in production of brown coal and lignite.

d. Labor, Productivity, and Wages.

Employment in Rumanian coal mines is reported as more than 26,000 persons in 1951. 117/ Based on the production that year of 3,773,000 tons,\* the productivity would have been about 145 tons per man-year, an extremely low figure by any standards.

An increase in the number of miners during the first 4 years of nationalization was announced by Prime Minister Gheorghiu-Dej. The exact amount was not stated. The Five Year Plan provides for a 60-percent increase in productivity. If a reported productivity of 0.6 ton per man-shift 118/ is assumed applicable in 1950, the planned productivity of 1 ton per man-shift would approach productivity in Western Europe.

Labor productivity in 1953 in the coal industry increased 5.7 percent over 1952. 119/ An incremental increase much higher than this would be necessary to achieve the planned increase in productivity by 1955.

Planned increases in productivity are based mostly upon increases in the utilization of mechanization. That planned productivity levels are not being achieved is indicated by a recent announcement that only 42 percent of existing coal-cutting machines and only 33 percent of the loading machines were used in April 1954.

\* See Table 6, p. 23, above.

S-E-C-R-E-T

Since the nationalization of the mines in 1948, wages have been increased several times, and bonuses for fulfillment and over-fulfillment of norms have been established for miners and for supervisory and technical personnel.

In 1951 the average miner in Rumania could earn 8,000 to 9,000 lei per month, a good miner 10,000 to 12,000 lei per month, and a poor miner 4,000 to 5,000 lei per month. 120/ In July 1952 the entire wage system was revamped and changed from a monthly to a piecework basis. 121/ By August 1952, in addition to the initiation of a system of bonuses, the daily wage had surpassed that of July 1952 by 30 percent. 122/ In March 1953, further increases were granted in the form of daily bonuses according to type of work. No current data on wage or income levels are available.

Added incentives to attract men to the mines are under way and planned for 1955. They are the construction of living accommodations; the establishment of a household loan system; the granting of free ground and building materials; reduced norms in special cases; and the improvement of vacation, recreation, and medical facilities. 123/

Increased emphasis on technical training is evident. According to the Five Year Plan, professional schools in the coal industry will graduate more than 1,800 students, technical high schools about 1,500, and superior technical schools about 750. 124/ About 730 students training to become mining engineers and specialists are studying at the Gheorghe Gheorghiu-Dej Mining Institute in Petrosani. In 1954 this institute will graduate 49 coal mining engineers and 39 mining technicians. Mines in the Jiul Valley now employ 150 engineers who have graduated from this institute. 125/

C. Fuel Briquettes.

Information on the fuel briquette industry of Rumania is incomplete, but the existence of several briquette plants has been reported.

A new briquette project was completed in March 1951 and was connected with the Filipestii-de-Padura-Palangei-Provita Valley lignite mines. 126/ Construction of another group of plants in the Sotanga lignite area was started in that same year. 127/ Completion of a third

S-E-C-R-E-T

group was expected in 1951 in the Derna-Tatarus lignite area, between the towns of Marghita, Suplacul-de-Barcau, and Derna Tatarus. 128/ Planned production of these plants has not been reported.

Two, or possibly three, other briquette plants are known to be in operation currently and are believed to have been in operation before World War II. The Concordia Briquette Factory at Vulcan, in operation in 1944, resumed production in 1948 for the first time since 1945. 129/ The production rate was reported as 4.4 tons per hour. 130/ Probably identical with this plant is the Vulcan Briquette Factory, which receives its coal from the Corin and Priboiu mines and probably produces 100 tons per day.\* 131/ Another plant is reported to be located in Recita, owned by the Recita Iron Mill and Corporate Holdings. It is highly probable that there are other briquette plants in Rumania, because there are at least 50 lignite and brown coal mines in the western section of the country.

The US Bureau of Mines has estimated the annual production of fuel briquettes in Rumania as 250,000 tons in 1950 and 1951, and 260,000 tons in 1952 and 1953. 132/

D. Coke.

1. General.

Since before World War II, Rumania has been dependent upon other countries for much of its supply of metallurgical coke. Expanding requirements of the iron and steel industry of the country have been met only in part by a gradual increase in the production of metallurgical coke since the war. Lack of import data makes it impossible to determine with any degree of accuracy the tonnages involved during the past several years. There are indications, however, that over one-half of the Rumanian requirements for metallurgical coke are met by imports from other Soviet Bloc countries, principally the USSR, Poland, and Czechoslovakia.

The Five Year Plan envisages self-sufficiency in metallurgical coke by 1955. In order to meet this Plan, however, it will be necessary for Rumania to perform a near-miracle in producing coke

1,000 tons per day, but this is probably an error.

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S-E-C-R-E-T

of metallurgical quality from brown coals or sub-bituminous coals. Coke from its best bituminous coals, of which reserves and productive capacity are limited, is poor by US standards. Furthermore, a new coking plant at Hunedoara, which would increase the metallurgical coke capacity of Rumania by over 400 percent, would have to be operating at full capacity in 1955 to meet the goal, and at present there is no record of coke being produced at this plant. It is believed, therefore, that Rumania will not meet its 1955 goal of self-sufficiency in metallurgical coke and that its dependency on outside sources of supply will increase.

In addition to metallurgical coke, Rumania produces small quantities of gas coke and semicoke.

2. Supply.

a. Production.

It is believed that there is only one plant producing metallurgical coke in Rumania. This is the Recita plant of the Recita Iron and Steel Combine, under the management of Sovrometal. Its prewar annual capacity of 90,000 tons was reportedly doubled in 1949. 133/ Additional annual capacity of 600,000 tons is planned for 1955 from a new coking plant at the Gheorghiu-Dej Metallurgical Plant at Hunedoara. Although construction was started in the early part of 1951, 134/ there is no record of coke production from this plant. A detailed description of all facilities, shops, and buildings at this metallurgical plant as of 3 October 1954 fails to include any reference to coke-oven batteries.

Reported production figures for metallurgical coke were 120,000 tons in 1950 and 156,000 tons in 1951. 135/

A report that the 1952 production of metallurgical coke exceeded 1951 production by 173.4 percent 136/ would indicate a 1952 production of 271,000 tons. This is in excess of the productive capacity of 180,000 tons and indicates either that the announced percentage increase is in error or that the 1951 production figure is in error. It is reported also that "metallurgical coke in 1953 increased 117 percent over 1952." 137/ An increase in production is inferred but not specifically stated. Pyramiding this increase gives a production of 325,000 tons in 1953, which is believed fantastic. It



S-E-C-R-E-T

is probable that the foregoing percentage increases are imports, or, as is less likely, total availabilities. They could indicate increased capacity at Hunedoara or other plants, but, in view of other available information, this is doubtful. It is estimated, therefore, that 1953 production of metallurgical coke was about 160,000 tons.

Production data for gas coke and semicoke are not available for postwar years. Based upon a manufactured gas production estimate for 1951, 138/ gas coke production is estimated at 25,000 tons.\* The Five Year Plan provides for an annual output of 160,000 tons of semicoke.

b. Imports.

Information on imports of metallurgical coke by Rumania is extremely fragmentary. Imports amounting to 62,944 tons in 1938 139/ increased over 300 percent to 207,000 tons in 1947. 140/ In 1949 the USSR agreed to supply 140,000 tons, and imports from Poland during that year were about 25,000 tons. One report, without giving tonnages involved, states that in 1952 the bulk of imports come from the USSR and that the proportion from Poland and Czechoslovakia is on the increase.

Based upon published pig iron production data 141/ and estimated metallurgical coke production figures, imports of metallurgical coke must have been about 200,000 tons annually in 1950 and in 1951, about 225,000 tons in 1952, and about 300,000 tons in 1953.

The foregoing import estimates are very crude. Actual allowance for charcoal tonnages which are known to be used in the production of a good grade of pig iron and allowance for inefficient conversion of poor-grade coke in producing pig iron have not been completely accounted for, but these two factors are compensating.

It is believed that the planned goals for metallurgical coke production, as for coal production, are quite optimistic, and in view of present trends will not be met. In all probability, Rumania will require substantial imports of coke in 1955. It is very doubtful that additional coke plant requirements for coking coal will be met by

\* Calculated at an estimated ratio of 570 cu m of gas per ton of gas coke and at an estimated production of 14 million cu m of manufactured gas.

S-E-C-R-E-T

the use of lower grades of indigenous coal as contemplated. It is likely, therefore, that any decrease in coke imports, occasioned by operation of new capacity, will be accompanied by an increase in imports of coking coal.

c. Stocks.

There is no information available on stocks of coke. Imports in 1947 were far in excess of requirements of metallurgical coke for pig iron production that year and might indicate the establishment of stockpiles which were probably depleted during and immediately following World War II. In subsequent years, however, there is no indication of changes in stocks.

3. Consumption.

Consumption of metallurgical coke at iron and steel plants in Rumania is divided among pig iron production, foundries, and other special processes. No breakdown of these uses is available.

Gas coke is believed to be used locally, mostly by industry. Semicoke is briquetted and is generally used by the railroads. 142/

E. Fuelwood.

1. General.

a. Trends.

Fuelwood has always represented a large part of the fuel requirements of Rumania. According to prewar statistics (average 1937-39), 28.7 percent of all fuel consumed was firewood. 143/ About 62 percent, or 11 million cu m, of the total average prewar annual production of roundwood of 17.9 million cu m was fuelwood. Average annual postwar production of fuelwood is 8.56 million cu m, or 63 percent of an average prewar production of roundwood of 13.6 million cu m. 144/ It is expected that production and consumption of fuelwood will decrease as more timber is diverted to industrial use, such as cellulose and paper and construction, and as the more efficient fuels, coal and oil, become plentiful.

S-E-C-R-E-T

b. Organization.

Prewar ownership of the 6.4 million hectares of forest in Rumania was divided as follows: state, 1.9 million (30 percent); communities, 2 million (30 percent); and companies and individuals, 2.5 million (40 percent). The greater portion of fuelwood came from the community and private forests. Fuelwood was distributed in the cities through thousands of small privately owned woodyards. Forests were placed under government control at the beginning of World War II, and fuelwood was rationed.

As far as is known, nationalization of forest properties took place in 1948. 145/ At present a large amount of fuelwood is produced by the Ministry of Forestry, Timber, and Paper Industries (which manages the forests and controls production of forest products) through its subordinate forestry enterprises, IPEIL (Intreprindere Pentru Exploatarea si Industrializarea Lemnului -- Enterprises for the Exploitation and Industrialization of Wood). Direct control of IPEIL is the responsibility of special organizations called trusts, which are in turn subordinate to the Ministry of Forestry, Timber, and Paper Industries. The Ministry now deals directly only with general problems, such as planning, statistics, and administration. 146/ Sovromlem (Soviet-Russian Timber Combine), theoretically under the control of the Ministry of Forest, Timber, and Paper Industries, 147/ also produces fuelwood.

Procurement and distribution of firewood on local levels (regiunes and rayons) is apparently coordinated by the People's Councils and Party Committees. Participating units are forestry directorates, regiune wood trust directorates, IPEIL, regiune Combustibilul (fuel) organizations, and others. 148/ It is believed that in addition to independent local fuelwood procurement by the People's Councils and Combustibilul units, these organizations receive substantial quantities from IPEIL and other government producers. 149/ Much of the local fuelwood haulage is done by the peasants. In 1951, distribution of some fuelwood (probably urban) was under the jurisdiction of Colemn (state-owned timber and fuelwood company). 150/

2. Supply.

a. Production.

Production of fuelwood, in millions of cu m of roundwood, is estimated as 12 in 1946, 8 in both 1950 and 1951, and 7 in 1954.

- 36 -

S-E-C-R-E-T

S-E-C-R-E-T

b. Imports.

Rumanian fuelwood imports are negligible.

c. Stockpiles.

Little information exists on fuelwood stockpiles. Fuelwood depots are filled during the summer and fall, 151/ and so far as is known there is no carryover from one winter to the next.

3. Consumption.

Wood is still an important fuel in domestic use, even though use of gas and coal has increased since the end of the war. There now appears to be a general deficiency of available fuelwood, the chief reason probably being the diversion of a larger portion of total timber production to industry and construction. This lack of firewood is not only reflected in last year's campaigns to stock fuelwood depots, but also in the year-by-year decrease in the winter ration.

Postwar exports of fuelwood are reported for 1948, 1949, and 1950, as 100,000 cu m per year, about one-half of prewar exports. 152/

4. Reserves.

Excessive felling during the past years has depleted the timber resources of Rumania. Net annual growth, which was estimated to be approximately 18 million cu m (prewar average 1935-38) has dropped to 15 million cu m in the postwar period (1946-50). 153/ Afforestation is being pushed in many areas, but these are long-range efforts and will be of little value as a source of wood supply in the immediate future. Although increased timber production is being stressed and total timber production appears to have increased, felling will eventually have to be restricted as the forest base is depleted.

F. Peat.

1. General.

Little has been reported concerning the status of the peat extraction and processing industry in Rumania. In 1944 it was known that some minor and local use was made of peat as fuel. 154/

S-E-C-R-E-T

2. Supply.

There are reported to be peat deposits in Botosani, Cluj, Sibiu, Stalin, and Suceava regiunes which could be used locally in place of wood. 155/ A large peat-producing installation was put in operation in Calatele, Cluj regiune, in August 1951, 156/ and in the previous year, peat deposits at Fagaras in Sibiu regiune were exploited for the first time. 157/ Production in all of Rumania is claimed to have been 300 percent greater in the first half of 1951 than in the corresponding period of 1950. In 1952 the Calatele installation expected to produce 1,500 freight cars of peat, 158/ and in Fagaras, where the brick-cutting extraction is used, 60,000 bricks a day were planned. 159/

3. Consumption.

There are no data available on the distribution and consumption of peat. Domestic and communal use of local peat reserves has been encouraged as a means of decreasing the use of wood. A widespread distribution of peat as a domestic fuel, however, is still in the planning stage. 160/

4. Deposits, Reserves, and Quality.

There is no information concerning the extent of the peat reserves in Rumania. All information as to their location may be found in 2, above.

5. Technology.

It is believed that peat extraction methods are generally primitive and largely manually performed. At the Fagaras deposits, the knife method of cutting the peat out in brick-shaped pieces is used. In 1950, mechanical methods were planned for the near future which would involve mechanical presses, elevators, and excavators. 161/

G. Manufactured Gas.

Manufactured gas is produced on a small scale in Rumania. Only five cities, Bucharest, Arad, Brasov (Orasul Stalin), Galati, and Timisoara, were reported to have a manufactured gas supply. 162/ The date of the foregoing information is unknown, but another report 163/ indicates that the gas company in Bucharest, following

S-E-C-R-E-T

nationalization in 1948, dismantled the manufactured gas plant and subsequently delivered only natural gas.

There are no manufactured gas grid systems, local industry accounting for about 80 percent of total consumption. 164/ A 1951 report states that the total annual output of manufactured gas is about 14 million cu m, and that about 66 percent is produced in Bucharest, but the date of information is not given. 165/

H. Capabilities, Vulnerabilities, and Intentions.

1. Capabilities.

According to Rumanian reports, coal production has fallen 3 to 6 percent below quotas during the past 3 calendar years. The planned goal for 1954 is not available, but current production trends indicate that 1955 production will fall about 30 percent below the planned output of 8.5 million tons. Despite this lag, it is estimated that production increases during the next 2 years will be at a higher rate than during the past 3 years. This estimate is based upon the fact that large reserves of brown coal and lignite are available, and further, that current levels of mechanization of the mines can be raised substantially.

The Rumanian goal of self-sufficiency in the production of metallurgical coke is believed to be extremely optimistic. Attainment of the goal presupposes the addition of new coke plant capacity, the use of low-grade coals, and the decrease in the average amount of coke required to produce a ton of pig iron. Of the three, the use of low-grade coals is believed most unlikely, and although new capacity may be added by 1955, it will be necessary for Rumania to import increasing amounts of coking coal to approach the iron and steel production goals.

2. Vulnerabilities.

The principal vulnerability of the solid fuels industries in Rumania as in almost all countries is in the transportation of the product from mine or coke plant to the consumer. The fact that Rumania relies so heavily on imports of metallurgical coke and coking coals makes distant rail and water transportation of these products particularly vulnerable.

S-E-C-R-E-T

As mine mechanization increases, the demand for electricity increases, and thus the central power plants upon which the mines depend become more important as bombing or sabotage targets.

3. Intentions.

The planned increases in the production of solid fuels are geared more or less to the planned expansion of heavy industry in such fields as ferrous metallurgy, railroads, and electric power. There is no indication of warlike intentions in the Plan, except as increases in capacity of coal, coke, and heavy industry in general add to the military potential. These increases are believed indicative only of the intention of Rumania to become as self-sufficient as possible.

III. Albania.

A. Introduction.

The Albanian economy before World War II was largely agricultural and pastoral in nature. There was little industrial activity, and the exploitation of natural resources, including the mining of coal, production of crude petroleum, and mining of copper and chrome ores, was extremely limited. Until November 1947 there were no railroad facilities. Electric power production was small, and its distribution limited. For lighting, the Albanians relied primarily upon kerosine; for heat, upon fuelwood garnered from local forests.

Since the "liberation" of Albania by the USSR, significant changes have taken place in its basic economy, designed to strengthen the country's economic bases, increase its industrial and agricultural production, and improve the standard of living. 166/

In November 1947 the first railroad to be built in Albania was opened to traffic. It extended from the seacoast port of Durres inland to Peqin, a distance of 26 miles. In February 1949 a second railroad line, extending from Durres to the capital city of Albania, Tirana, was placed in service; thereby increasing total railroad mileage to 54 miles. 167/ An industrial railroad was later built from the port of Vlona to Selenica to transport asphalt to the coast for processing. 168/

S-E-C-R-E-T

In 1950 the First Five Year Plan (1951-55) was promulgated. Under it the production of coal was to be substantially increased; railroads were to be extended; several small thermal electric power plants, together with numerous hydroelectric power plants, including a large one of 20,000-kilowatt capacity on the Mat River, were to be constructed; petroleum extraction was to be stepped up; and production of copper and chrome ores was to be substantially increased. 169/

In 1954, production of lignite represented 17.5 percent of total energy produced from primary sources in Albania. Petroleum was the most important source of energy, supplying 42.7 percent of the total. Fuelwood ranked second to petroleum, supplying 39.6 percent of the total energy produced. The balance of sources of primary energy produced in Albania, 1954, is shown in Table 8.\*

B. Coal.

1. Production.

Production of coal in Albania is believed to consist wholly of lignite. The best known deposits are in the Memaliaj Coal Field in the Tepelene area,\*\* and it is reported that four seams in the field contain a superior coal similar in quality and use possibilities to sub-bituminous coal or to good-quality brown coal. 170/ In the absence of more positive identification, and for the purpose of this report, it is considered to be high-grade lignite.

Before World War II, total coal production was insignificant and is reported to have been about 4,000 tons in 1938. 171/ Following World War II, annual production has increased to a calculated total of 303,000 tons in 1954 and a planned production total of approximately 404,000 tons in 1955. Volumes produced have been reported in percentage increases over previous years, and tonnages calculated from such percentages are shown in Table 9\*\*\* for the years 1950-54. The table also shows planned production for 1955.

The coal mines, of which there are presumed to be 11 in active production, are located in close proximity to the principal consuming centers. A list of mines, showing names and locations,

\* Table 8 follows on p. 42.

\*\* See Appendix C.

\*\*\* Table 9 follows on p. 43.



S-E-C-R-E-T

Table 8

Estimated Balance of Sources of Primary Energy Produced in Albania  
1954

Source of Energy	Production		Standard Fuel Equivalent a/ (Thousand Metric Tons)	Percent of Total
	Unit	Amount		
Lignite	Thousand metric tons	303 b/	152	17.5
Petroleum	Thousand metric tons	260 c/	371	42.7
Fuelwood	Thousand metric tons	1,850 d/	2	39.6
Hydroelectric power	Million kilowatt-hours	20 e/	344	0.2
Total			<u>869</u>	<u>100.0</u>

- a. Standard fuel equivalent of 7,000 kilocalories per kilogram.
- b. Average heat value of 3,500 kilocalories per kilogram.
- c. Average heat value of 10,000 kilocalories per kilogram.
- d. Average heat value of 1.3 million kilocalories per cu m.
- e. Average heat value of 860 kilocalories per kilowatt-hour.

S-E-C-R-E-T

Table 9

Estimated Production of Lignite in Albania  
1950-55

<u>Thousand Metric Tons</u>	
<u>Year</u>	<u>Amount</u>
1950	55 <u>a/</u> <u>b/</u>
1951	66 <u>a/</u> <u>c/</u>
1952	98 <u>a/</u> <u>d/</u>
1953	213 <u>a/</u> <u>d/</u>
1954	303 <u>e/</u>
1955	404 <u>f/</u>

a. On the basis of the announced percentage increase.

b. 172/

c. 173/

d. 174/

e. 175/

f. Estimate based on trends.

is given in Appendix C. Most of the mines are open-pit workings. Before World War II, mining methods and equipment were extremely primitive. Electricity was not available to any of them, and primary functions of production were performed by manual labor. Under the tutelage of its "liberators," Albania gradually increased its production of electricity and extended its distribution, so that by 1950 it was able to supply one coal mine (Mborje-Drenov) with electric power and make possible the use of modern Soviet mining equipment in that mine. 176/ Because the supply of electricity has increased and its distribution has been widened, it is believed that it has been, or soon will be, made available to other and probably all coal mines. Increased coal production through modernization of mining equipment has been and will continue to be the logical result.

Data on the size of the mine labor force and productivity per man-year are available only for 1948. In that year, when production was less than 25,000 tons, employment was understandably small,

S-E-C-R-E-T

numbering between 2,000 and 3,000, and productivity per worker was extremely low, averaging little more than 7 tons per man per year. 177/ Stimulation of production as a result of modernization and mechanization of the mines may require a larger labor force, but the productivity per man-year should materially increase.

Most lignite in Albania is of poor quality. An exception is the lignite produced at the Memaliaj Mine, which -- being low in ash and sulfur and high in calorific value -- is better than other Albanian lignite. It closely resembles sub-bituminous coal in character and is equal in quality to the better grades of lignite and brown coal being produced in other Soviet Bloc countries. 178/

2. Trade.

a. Exports.

There is no record of any lignite being exported from Albania.

b. Imports.

Albanian importation of coal apparently began soon after World War II. In 1949 a trade agreement was negotiated with Poland under which Polish hard coal was to be exchanged for Albanian petroleum, ores, wool, and various other products. It is believed that coal imported under this agreement did not exceed 3,000 tons in 1949. Fragmentary information for subsequent years indicates that the importation of Polish coal has continued in amounts equal to and possibly somewhat higher than in 1949. 179/

3. Consumption.

Albania consumes all of the lignite it produces, and the principal areas of consumption are near the mining areas. Small industries consume the bulk of the production, and ore refining, thermal electric power production, and railroad locomotives consume the balance. Information is not available on the type of consumers, or the tonnage consumed by each, in any consuming area.

S-E-C-R-E-T

The bulk of the imported hard coal is believed to be consumed at the coastal ports of Durres and Vlone, where it is received by vessel, and at nearby points on the railroads radiating therefrom. These are the only areas served by the limited railroad facilities presently existing in Albania. Railroad locomotives, a machine works, miscellaneous small industries, and possibly some coal-fired electric power plants account for the major portion of the consumption of the imported hard coal. A small amount may be used for the bunkering of vessels at the coastal ports.

Thermal electric power plants throughout the whole of Albania, fueled with indigenous lignite or imported Polish hard coal, are estimated to have consumed in 1953 approximately 60,000 tons, or about 28 percent of the available supply.

4. Reserves.

Estimates of tonnages of recoverable lignite contained in presently undeveloped beds are not available, but amounts are believed to be relatively small. In most areas the lignite beds, varying in thickness from 2 to 3 feet in the Pogradec area and from 3 to 7 feet in the Tirana area, pitch steeply and will be difficult to mine. Where the seams lie closest to the surface, open-pit mining offers the greatest opportunity for future development. 180/ Reserves of the high-grade lignite in the Memaliaj Mine area are estimated at 1 million tons. 181/

C. Coke.

No coke is produced in Albania. The indigenous lignite is not suitable for coking, and there are no coke ovens in Albania. The principal consumer of coke is the Enver Hoxha Machine Works at Tirana, but small amounts may be required by other industries in that area. It is believed that the amount used annually by all consumers does not exceed 4,000 tons. It is estimated that approximately 4,000 tons of coke are annually imported from the USSR. 182/

D. Fuelwood.

The use of wood as fuel for home cooking and heating, for heating of public buildings and small trade establishments, and for heat and

S-E-C-R-E-T

power in small industrial plants is prevalent throughout Albania, particularly in the rural areas far removed from centers of lignite production. At the present rate of consumption, it is estimated that the available supply of fuelwood will continue to be adequate for normal needs for many years.

The annual production of fuelwood, in millions of cu m of roundwood, is estimated as 1.8 in 1950 and 1.85 in 1952, 1953, and 1954.

E. Stockpiles.

The close proximity of the areas of consumption to the lignite mines which serve them and the dependence upon local means of transportation for deliveries from the mines reduce to a minimum the necessity for stockpiling lignite at the consuming plants. As lignite disintegrates in open storage, it is unlikely that an appreciable amount would be accumulated. The imported hard coal and coke store better, but as the consumption is small, the amount stockpiled would be no more than needed for current use.

Accumulation of fuelwood reserves is seasonal, being at its peak in early fall and at its lowest in late spring. Figures are not available showing volumes in storage in either season.

There is no evidence of any state storage reserves being maintained for lignite, imported hard coal and coke, or for fuelwood.

F. Capabilities, Vulnerabilities, and Intentions.

1. Capabilities.

The growing requirements of Albania for solid fuels will continue to be supplied by indigenous lignite and fuelwood, augmented by small imports of hard coal and coke. As more mines are supplied with electric power and modern equipment, further increases in production can be accomplished. The Five Year Plan (1951-55) indicates the Albanian desire to proceed with such modernization as rapidly as possible.

S-E-C-R-E-T

2. Vulnerabilities.

Soviet mining equipment and know-how have made possible the present degree of modernization, and as the need for more lignite develops, Albania must continue to rely upon the USSR and other Soviet Bloc countries for the needed facilities. Being without means of its own to produce mining machinery, the lignite production of Albania is vulnerable to outside influences which might adversely affect the freedom of others to supply it. An adequate supply of electric power and uninterrupted distribution to the mechanized mines is vital to the maintenance of and increase in production of lignite.

3. Intentions.

Under the Five Year Plan the substantial increase in the volume of railroad transportation envisaged by 1955 involved the building of a railroad line from the coastal port of Vlona to the Memaliaj Mine, for the purpose of transporting coal from that mine. 183/ Because of its good quality, this coal would be acceptable to other Soviet Bloc countries, and the building of this railroad might indicate an intent to export it in the future.

There is nothing in the achievements of the solid fuels industries to date or in their plans for the future which would indicate warlike intentions.

S-E-C-R-E-T

APPENDIX A

STATISTICAL TABLES

Table 10

Estimated Production of Coal in Bulgaria  
1936-54 and 1957

Thousand Metric Tons				
<u>Year</u>	<u>Hard Coal a/</u>	<u>Brown Coal b/</u>	<u>Total</u>	<u>Planned</u>
1936 <u>c/</u>	105	1,576	1,681	
1937 <u>d/</u>	123	1,732	1,855	
1938 <u>e/</u>	146	1,855	2,001	
1939	164 <u>f/</u>	2,050 <u>g/</u>	2,214 <u>h/</u>	
1940	215 <u>i/</u>	2,550 <u>j/</u>	2,765 <u>k/</u>	
1941	212 <u>l/</u>	2,785 <u>m/</u>	2,997 <u>n/</u>	
1942	220 <u>o/</u>	3,842 <u>g/</u>	4,062 <u>p/</u>	
1943	204 <u>q/</u>	3,852 <u>g/</u>	4,056 <u>r/</u>	
1944 <u>s/</u>	125	2,890	3,015	
1945 <u>t/</u>	128	3,435	3,563	
1946 <u>u/</u>	93	3,420	3,513	
1947 <u>v/</u>	120	4,011	4,131	4,544 <u>w/</u>
1948	170 <u>x/</u>	4,169 <u>g/</u>	4,339 <u>y/</u>	5,034 <u>z/</u>
1949	203 <u>aa/</u>	5,111 <u>g/</u>	5,314 <u>bb/</u>	5,269 <u>cc/</u>
1950	220 <u>dd/</u>	5,603 <u>g/</u>	5,823 <u>ee/</u>	6,021 <u>ff/</u>
1951	284 <u>gg/</u>	6,026 <u>g/</u>	6,310 <u>hh/</u>	7,267 <u>ii/</u>
1952	348 <u>jj/</u>	7,062 <u>g/</u>	7,410 <u>kk/</u>	6,947 <u>ll/</u>
1953	394 <u>mm/</u>	7,834 <u>g/</u>	8,228 <u>nn/</u>	8,477 <u>oo/</u>
1954	440 <u>pp/</u>	8,364 <u>g/</u>	8,804 <u>qq/</u>	8,985 <u>rr/</u>
1957	600 <u>pp/</u>	10,800 <u>g/</u>	11,400 <u>ss/</u>	14,000 <u>tt/</u>

a. Hard coal includes anthracite and bituminous.

b. Brown coal includes lignite.

c. 184/

d. 185/

e. 186/

S-E-C-R-E-T

Table 10

Estimated Production of Coal in Bulgaria  
1936-54 and 1957  
(Continued)

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f.	<u>187/</u>
g.	A residual amount.
h.	<u>188/</u>
i.	<u>189/</u>
j.	<u>190/</u>
k.	<u>191/</u>
l.	<u>192/</u>
m.	<u>193/</u>
n.	<u>194/</u>
o.	<u>195/</u>
p.	<u>196/</u>
q.	<u>197/</u>
r.	<u>198/</u>
s.	<u>199/</u>
t.	<u>200/</u>
u.	<u>201/</u>
v.	<u>202/</u>
w.	<u>203/</u>
x.	Based on an estimate of 150,000 tons of bituminous <u>204/</u> and 20,000 tons of anthracite.
y.	196 percent of 1939 production. <u>205/</u>
z.	<u>206/</u>
aa.	Based on an estimate of 183,000 tons of bituminous <u>207/</u> and 20,000 tons of anthracite.
bb.	240 percent of 1939 production. <u>208/</u>
cc.	<u>209/</u>
dd.	Based on an estimate of 200,000 tons of bituminous <u>210/</u> and 20,000 tons of anthracite.
ee.	263 percent of 1939 production. <u>211/</u>
ff.	<u>212/</u>
gg.	By interpolation.
hh.	285 percent of 1939 production. <u>213/</u>
ii.	Production plan for 1951 reported at 124.8 percent of 1950 production. <u>214/</u>



S-E-C-R-E-T

Table 10

Estimated Production of Coal in Bulgaria  
1936-54 and 1957  
(Continued)

- 
- jj. Estimated from data given in source 215/.  
kk. 216/  
ll. Production plan for 1952 was to be 110.1 percent of 1951 production. 217/  
mm. Hard coal production was 113 percent of 1952 production. 218/  
nn. 141.3 percent of 1950 production. 219/  
oo. Coal production in 1953 was to be increased 14.4 percent over the 1952 level.  
pp. Projection of recent average annual trend.  
qq. During first 7 months of 1954, 353,000 tons more of coal were produced than during the same period of 1953. 220/ This figure projected to 12 months gives an increase of 576,000 tons over 1953 production.  
rr. Coal production was to increase 9.2 percent over 1953 production. 221/  
ss. Projected at the approximate 1951-54 rate of increase.  
tt. 222/

S-E-C-R-E-T

Table 11

Estimated Production of Coal in Rumania  
 1936-55

Year	Thousand Metric Tons			
	Hard Coal <u>a/</u>	Brown Coal <u>b/</u>	Total	Planned
1936 <u>c/</u>	292	1,672	1,964	
1937	303	1,880	2,183	
1938	299	2,097	2,396	
1939	285	2,300	2,585	
1940	258	2,386	2,644	
1941	264	2,195	2,459	
1942	285	2,367	2,652	
1943	306	2,604	2,910	
1944	202	2,069	2,271	
1945	211	1,820	2,031	
1946	167	1,784	1,951	
1947	163	2,105	2,268	
1948	200	2,631	2,831	
1949	230	2,576	2,806	
1950 <u>d/</u>	300	2,900	3,200	
1951	340 <u>e/</u>	3,433 <u>e/</u>	3,773 <u>e/</u>	4,006 <u>f/</u>
1952	381 <u>g/</u>	3,856 <u>g/</u>	4,237 <u>g/</u>	4,355 <u>h/</u>
1953	400 <u>i/</u>	4,049 <u>i/</u>	4,449 <u>i/</u>	4,695 <u>j/</u>
1954	450 <u>k/</u>	4,550 <u>k/</u>	5,000 <u>k/</u>	N.A.
1955	500 <u>k/</u>	5,100 <u>k/</u>	5,600 <u>k/</u>	8,500 <u>l/</u>

a. Hard coal includes anthracite and bituminous coal.

b. Brown coal includes lignite.

c. 223/

d. 224/

e. 117.9 percent of 1950 production 225/ applied to total and separated into hard coal and brown coal according to respective percentages, 9 and 91, in 1950 and in the 1955 plan.

f. 125.2 percent of 1950 production. 226/

g. 112.3 percent of 1951 production, 227/ applied as in note a, above.

h. 1952 production plan fulfilled 97.3 percent 228/ (equivalent to 115.4 percent of 1951 production).

S-E-C-R-E-T

Table 11

Estimated Production of Coal in Rumania  
1936-55  
(Continued)

- 
- i. 105 percent of 1952 production. 229/
  - j. 1953 production plan fulfilled by 94.8 percent 230/  
(equivalent to 110.8 percent of 1952 production).
  - k. Estimate based on recent trends.
  - l. 231/

Table 12

Estimated Production of Lignite in Albania a/  
1936-55

Thousand Metric Tons

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<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>	<u>Year</u>	<u>Amount</u>
1936	3	1941	20	1946	17	1951	66
1937	4	1942	20	1947	11	1952	98
1938	4	1943	10	1948	22	1953	213
1939	16	1944	5	1949	45	1954	303
1940	20	1945	9	1950	55	1955	
						Plan	404

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a. For sources of data, see Methodology, Appendix D.

S-E-C-R-E-T

APPENDIX B

COAL DEPOSITS IN BULGARIA

1. Anthracite.

Anthracite deposits are found only in the northwestern and western parts of Bulgaria. The largest deposits are in the Iskur Basin, and mines are located in the vicinity of Svoqe, about 24 kilometers north of Sofia. The deposits are of early carboniferous age. Only two coal beds have been discovered, but it is believed that there may be another. Each bed varies from 0.4 to 1.2 meters in thickness. 232/ Considerable folding has displaced the seams and crushed the coals to such an extent that mining is difficult. Little lump coal can be obtained. 233/ Proximate analysis of the Svoqe coals is as follows: 2 to 7 percent moisture, 6 to 30 percent ash, 0.5 to 1.2 percent sulfur, 1.5 to 6 percent volatile matter, and 60 to 90 percent fixed carbon. The calorific value ranges from 5,500 to 7,000 kilocalories per kilogram. 234/

There are several small anthracite deposits near the Yugoslav border -- in the vicinity of Kula, in the Belogradchik Basin, and in the Vratsa district. It is believed that none of these deposits is being exploited; with the possible exception of the Belogradchik Basin (Sveta Elena Mine, Stakevtsi) from which 1,000 tons in 1941 and 54 tons in 1944 were extracted. 235/ Coal seams in the latter basin are reported to be about 1 meter thick and decrease in thickness with increasing depth. 236/

2. Bituminous Coal.

There are three known basins of bituminous coal in Bulgaria -- the Balkan, Vrushka Chuka, and Souchosterel. The Balkan Basin in the east-central part of Bulgaria extends for about 80 to 95 kilometers from Gabrovo in the west to near Mokren and Gradets in the east, north of Kazanluk and Sliven. 237/ The largest known deposits of bituminous coal in Bulgaria are in this basin in 8 major and 12 minor coal beds. 238/ Important beds range up to 2 meters in thickness, 239/ are steeply inclined, 240/ and contain considerable clay. 241/ Analysis of "pure coal" layers show the following: 5 to 35 percent ash, 1 to 3 percent sulfur, 11 to 36 percent volatile matter, and 50 to 80 percent fixed carbon. Calorific values range from 4,500 to 8,000

S-E-C-R-E-T

kilocalories per kilogram. 242/ There are five important mines in this area, Prince Boris, Lev, Tvurditsa, Cardiff, and Chumerna, and possibly some others. 243/

The Vrushka Chuka Basin is near Belogradchik, southwest of Vidin and Sofia. There is only one mine in the basin, the Vrushka Chuka, which produced 27,000 tons, mainly for export, in 1942. 244/

The Souchosterel Basin is southwest of Gorna Dzhumaya, near the Yugoslav border. There are three coal seams of tertiary formation, one of which has a thickness of about 1 meter and was mined during World War II. No recent information is available, but the coals have excellent coking qualities. 245/

3. Brown Coal.

There are three major brown coal basins in Bulgaria, the Dimitrovo, Bobov Dol, and Pirin-Struma, in that order of importance as to reserves and annual production. The Dimitrovo Basin is the most important brown coal area in Bulgaria and is located approximately 30 kilometers southwest of Sofia. 246/ There are 4 coal seams, with a combined thickness ranging from 6 to 16 meters at the 7 September mine, 247/ of which 3 are being exploited. Proximate analyses of the coal show the following: 11 to 13 percent moisture, 20 to 25 percent ash, 30 to 40 percent volatile matter, 1.5 percent sulfur, 30 to 50 percent fixed carbon, and 4,500 to 5,500 kilocalories per kilogram. 248/

During the past 15 years, the Dimitrovo mines, of which there have been 9 to 11 in operation, have accounted for 70 to 80 percent of the annual production. Output has increased from 3.1 million tons in 1947 249/ to 4 million tons in 1950, 250/ and an estimated 4 million tons in 1953. 251/ A large portion of Dimitrovo output comes from the 7 September and Republica strip mines. The former has been producing about 1 million tons annually and the Republica was expected to provide 1.5 million tons annually when it reached capacity. 252/ Most of the other mines at Dimitrovo are larger than those in other parts of the country.

The Bobov Dol and Pirin-Struma Basins are located in the southwest quarter of Bulgaria, about 80 kilometers from the Yugoslav border. There are known to be 5 coal seams in the Bobov Dol Basin with a total thickness of from 5 to 7 meters. 253/ In the Pirin-Struma Basin there is but 1 coal bed, 8 to 12 meters thick. 254/

S-E-C-R-E-T

Proximate analyses of the coal show the following: Bobov Dol coal -- 10 to 12 percent moisture, 10 to 15 percent ash, 35 to 40 percent volatile matter, 1.5 to 3 percent sulfur, and 5,500 to 6,000 kilocalories per kilogram; Pirin-Struma coal -- 11 percent moisture, 11 percent ash, 35 to 40 percent volatile matter, 1.5 percent sulfur, 40 to 42 percent fixed carbon, and 5,000 to 6,000 kilocalories per kilogram. The Pirin Mine, located at Brezhani, is the only mine in the basin. 255/

4. Lignite.

The remaining coal basins in Bulgaria are lignite deposits located mainly in the central and Black Sea coastal regions. The most important of these, on a production basis, are the Maritsa Basin, the Nikolaevo Basin, and the Burgas Basin. The Maritsa Basin produces roughly twice as much as either of the others. Other less productive areas are the Slivnitsa, the Sofia, the Lom, the Chukurovo, Dospei, and Cham-Koria Basins.

The Maritsa Basin is located in the center of Bulgaria in an area of 15,000 square kilometers, between the cities of Khaskovo and Stara Zagora. There are known to be 4 to 5 beds of which only 1, the Kiprenski bed, is exploited to any extent. 256/ The beds dip from 50 to 10 degrees and are interstratified with shales and hard sandstones. 257/ Proximate analyses of the coal show the following composition of the coal: 40 to 50 percent moisture, 15 to 20 percent ash, 35 to 40 percent volatile matter, 4.5 percent sulfur, 10 to 20 percent fixed carbon, and a calorific value of 2,500 to 3,000 kilocalories per kilogram. 258/ The following mines are known to be operating in this basin: the Maritsa, the Vulcan, the Novi Rudnitsa, the Vera, the Nadezhda, and the Merichleri. 259/ Because of the high sulfur and moisture content of coal from these mines they are unsatisfactory as household fuels and generally difficult to use. 260/

The Nikolaeva Basin is 15 to 18 miles east of Kazanluk. It is reported that there are 2 coal beds, with a combined thickness of about 2 meters, which are being exploited. Proximate analyses of the coal show 30 percent ash content, 25 to 30 percent volatile matter, 20 to 30 percent fixed carbon, up to 4 percent sulfur, and a calorific value of 3,500 to 4,500 kilocalories per kilogram. Two mines, the Uspeh and Nikolaeva, have been exploited during recent years. 261/

S-E-C-R-E-T

The Burgas lignite basin is situated on the Bulgarian Black Sea coast, northwest of the city of Burgas. There is only one mine in the basin, the Cherno More Mine. There are 6 coal beds ranging up to 1.5 meters in thickness. It has been reported that 3 seams have been exploited during the past few years. Proximate analyses of the coal show 13 to 14 percent moisture, 15 to 20 percent ash, 3.4 percent sulfur, 40 to 50 percent fixed carbon, and a calorific value of 4,500 to 6,000 kilocalories per kilogram. 262/

S-E-C-R-E-T

APPENDIX C

COAL MINES IN ALBANIA

<u>Area and Mine</u>	<u>Mine Location</u>	<u>Coordinates</u>
Tirana		
Golemia	Goleme	41°35' N - 19°39' E
N.A.	Priske	41°19' N - 19°55' E
N.A.	Sketerr	41°13' N - 19°56' E
Kraba	Qaf'e Krrabes	41°12' N - 19°58' E
Elbasan		
N.A.	Galush	41°07' N - 19°49' E
Calushit	Peqin	41°03' N - 19°45' E
Pogradec		
N.A.	Pogradec	40°54' N - 20°40' E
N.A.	Halarup	40°52' N - 20°47' E
Korce		
Mboye-Drenov	Drenove	40°35' N - 20°47' E
N.A.	Boria	N.A.
Tepelene		
Memaliaj	Memaliaj	40°20' N - 19°57' E



S-E-C-R-E-T

APPENDIX D

METHODOLOGY

1. Bulgaria.

Total coal production data have been reported in Bulgarian press and radio releases and other sources through 1946. Since then, estimates have been based upon reported percentage or tonnage increments. The last year for which a fairly firm figure on coal production is available is 1952. The Bulgarian Minister of Heavy Industry announced that, during that year, coal production exceeded 1939 production by 5,288,400 tons. Not only did this provide a reasonable base figure for 1952, but supported other calculated figures.

In developing the energy table\* the absence of published average heating value information on each type of coal made it necessary to adopt arbitrarily the values used for the respective Rumanian coals..

Derivations of the other figures are given in the section dealing with Bulgaria.\*\*

2. Rumania.

This report is based upon  Rumanian press and radio releases, US Bureau of Mines publications, and other usual intelligence sources. The last year for which firm figures on coal production are available is 1950. Subsequent coal production estimates are made on the basis of published percentage increases.

50X1

A published coal production figure of 6.1 million tons for 1953 <sup>263/</sup> is believed to be the rate of production for a short period near the end of the year. The estimate in this report of 5 million tons for 1954 has been developed by annual percentage increases since 1950, and can be further checked by applying published percentages to the production of earlier years.

\* P. 6, above.

\*\* I, above.

S-E-C-R-E-T

Production data on the various energy components used in developing the energy balance were supplied by the relevant divisions of ORR.

Whenever complex derivations for figures have been followed, an attempt has been made to explain the procedure in detail, either in the text or in footnotes.

3. Albania.

Produced tonnages shown in Table 9\* for the years 1950-53 were calculated from percentages over previous years as reported by Albanian authorities. The year 1950 was related percentagewise to 1948, and 1952 was related to 1950, with 1951 representing a percentage relationship to both 1950 and 1952. The year 1953 was also related percentagewise to 1950. In the absence of specific production figures expressed in tons, it is believed these calculated tonnages are reasonably close to actual production. The 1954 estimate and the 1955 planned tonnages are believed to reflect the logical progression under the Five Year Plan.

Productivity per man-year in 1948 was calculated by dividing production by number of workers reported in that year. No calculation for other years could be made, because basic figures in employment were not available. With the introduction of modern mining equipment and methods, it is believed the production per man-year will be substantially increased.

The assumption that coal consumption is largely in local towns and villages contiguous to the mining areas is based on the absence of rail transportation and the dependence on local area transportation facilities.

Produced tonnages of lignite shown in Table 12\*\* for the years 1936-44 are reported figures.

		50X1
		50X1

\* P. 43, above.

\*\* P. 53, above.

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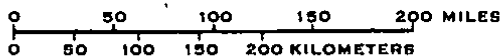
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# BULGARIA - RUMANIA - ALBANIA COAL DEPOSITS

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● Anthracite and Bituminous Coal

● Brown Coal and Lignite



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