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CURRENT SUPPORT MEMORANDUM

PLANNED USSR ELECTRIC POWER TRANSMISSION NETWORKS

OFFICE OF RESEARCH AND REPORTS

CENTRAL INTELLIGENCE AGENCY

This report represents the immediate views of the originating intelligence components of the Office of Research and Reports. Comments are solicited.

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PLANNED USSR ELECTRIC POWER TRANSMISSION NETWORKS

One of the principal goals of the Soviet Sixth Five-Year Plan is the construction of a high-voltage transmission network to connect the power systems of European USSR and the Urals. During this time, construction will continue on an extensive transmission network in Siberia. Eventually these two systems will be joined. These networks will provide greater flexibility and reliability in the electric power supply of vital industrial centers. They will allow large amounts of relatively low-cost hydroelectric power generated at very large Kuibyshev, Stalingrad, and Bratsk hydroelectric stations to be transmitted to distant industrial centers, and thus provide the centers connected by this system with a secondary source of power supply in the event that a local power plant is rendered inoperative.

The European USSR-Urals network, according to G. M. Malenkov and A. S. Pavlenko, Minister and Deputy Minister of Electric Power Stations, 1/ is scheduled to be in operation by the end of 1960 with a connected generating capacity of 28 million kilowatts, an amount equal to the USSR's total capacity at the end of 1953. Although it is unlikely that this network will be completed by the end of 1960, some of the lines will be in operation. The first link, to be completed in early 1956, will be the Kuibyshev-Moscow line, originally planned to be in operation by the end of 1955. 2/ This entire network will operate at 400 kilovolts, the highest transmission voltage in the world.

During the Sixth Five Year Plan, work will progress on the construction of a West Siberian network. 3/ It will connect power plants in Ust Kamenogorsk, Omsk, Barnaul, and Krasnoyarsk with the Kuzbas power system including Novosibirsk, Tomsk, Kemerovo and Stalinsk. A seasonal interchange of power can occur over this system between the hydroelectric plants at Novosibirsk and in the Ust Kamenogorsk area, and the thermal electric plants in the Kuzbas. It is believed that the north-south (Ust-Kamenogorsk-Novosibirsk) line will operate at 200 kilovolts, whereas the east-west lines which form the link from the Urals to East Siberia along the Transiberian railroad will probably be operated at 400 kilovolts.

In East Siberia, the Bratsk hydroelectric station--to be the largest in the world with a capacity of 3.2 million kilowatts--is planned to be in partial operation by the end of 1960. 4/ Four hundred (or more) kilovolt transmission lines will be constructed from Bratsk to industrial centers at Krasnoyarsk and Irkutsk, and will comprise the backbone of an East Siberian network. The Bratsk-Irkutsk line, now under construction, will initially supply power for the construction of Bratsk station from the new Irkutsk hydroelectric station which is expected to go into operation in 1956. 5/

Near Krasnoyarsk on the Yenisey, still another super hydroelectric station of 3.2 million kilowatts--almost equal in size to that at Bratsk--will be started under the Sixth Five Year Plan. This plant and others--such as a hydroelectric station to be built on the Ob at Kamensk with a 500,000 kilowatt capacity--also will be connected to the East Siberian network in the 1960's under the Seventh or Eighth Five Year Plan.

The connecting link between the Siberian and European USSR-Urals networks probably will be a line from Omsk to Chelyabinsk. It will probably operate at 400 kilovolts and will be one of the last transmission lines completed.

After the interconnection of the networks, it should not be inferred that power plants in Moscow, to take a hypothetical case, could then directly supply power to Irkutsk, a distance exceeding 4,000 km. The transmission losses involved over such a distance would be prohibitive. Rather, power could conceivably be made available over such distances by a "displacement" process. That is, Moscow could increase its local power plants' production so that Kuibyshev hydroelectric station could reduce its supply to Moscow and increase its supply to Chelyabinsk. Chelyabinsk could in turn release additional power for transmission to Omsk, etc., so that Irkutsk could conceivably receive additional power from the network by a series of "displacement" actions originated from Moscow.

The design and construction of the 400 kilovolt transmission system will be a noteworthy engineering achievement. Some aid was obtained from German and Swedish experience along this line, but the design of this system to transmit electricity over what has heretofore been considered uneconomic distances is primarily a Russian accomplishment.

Transmission Lines of the Planned USSR High-Voltage Network

Line	Voltage (Kilovolts)	Planned Completion Date	Remarks
Moscow-Kuibyshev 7/	400	1956	European USSR and Urals Network. Originally planned for completion in '55. Planned to transmit 6.1 billion kwh annually to Moscow after full completion of Kuibyshev GES.
Moscow-Stalingrad 8/	400	1957 Or '58	Originally planned for completion '56. Planned to transmit 4.0 billion kwh annually to Moscow and 1.2 billion kwh annually to points along the route, after full completion of Stalingrad GES.
Moscow-Leningrad 9/	prob. 400	not known	Will effect tie between Moscow-Gorkiy and Leningrad power systems.
Moscow-Zaporozh'ye 10/	prob. 400	not known	Possibly planned, based on unconfirmed report.
Stalingrad-Donbas 11/	prob. 400	1957 Or '58	Will probably terminate in Stalino area. It may possibly be extended as far as Zaporozh'ye. May be 400 kv direct current.
Tbilisi-Stalingrad 12/	not known	not known	Possibly planned. Would connect Transcaucasus power system to network at Stalingrad, or possibly to Stalino area in Donbas.
Kuibyshev-Molotov 13/	400	not known	Would connect the northern section of Urals power system at Molotov, near Kama hydroelectric station, with network at Kuibyshev.

Analyst:

1. Elektrichestvo, No. 7, Jul 55, U
2. Pravda, 14 Oct 55, p. 2, U
3. CIA. FBIS Economic Item 74283, Moscow, Home, 25 Sep 55, OFF USE
4. Pravda, 24 Nov 55, U
5. Ibid.
6. CIA. FBIS Daily Report, 17 Jan 56, OFF USE
7. Pravda, 21 Aug '50, U
8. Pravda, 31 Aug 50, U

9. Krasnaya Zvezda, 29 Jul 55, U
10. Ibid.
11.
12. Krasnaya Zvezda, 29 Jul 55, U
13.
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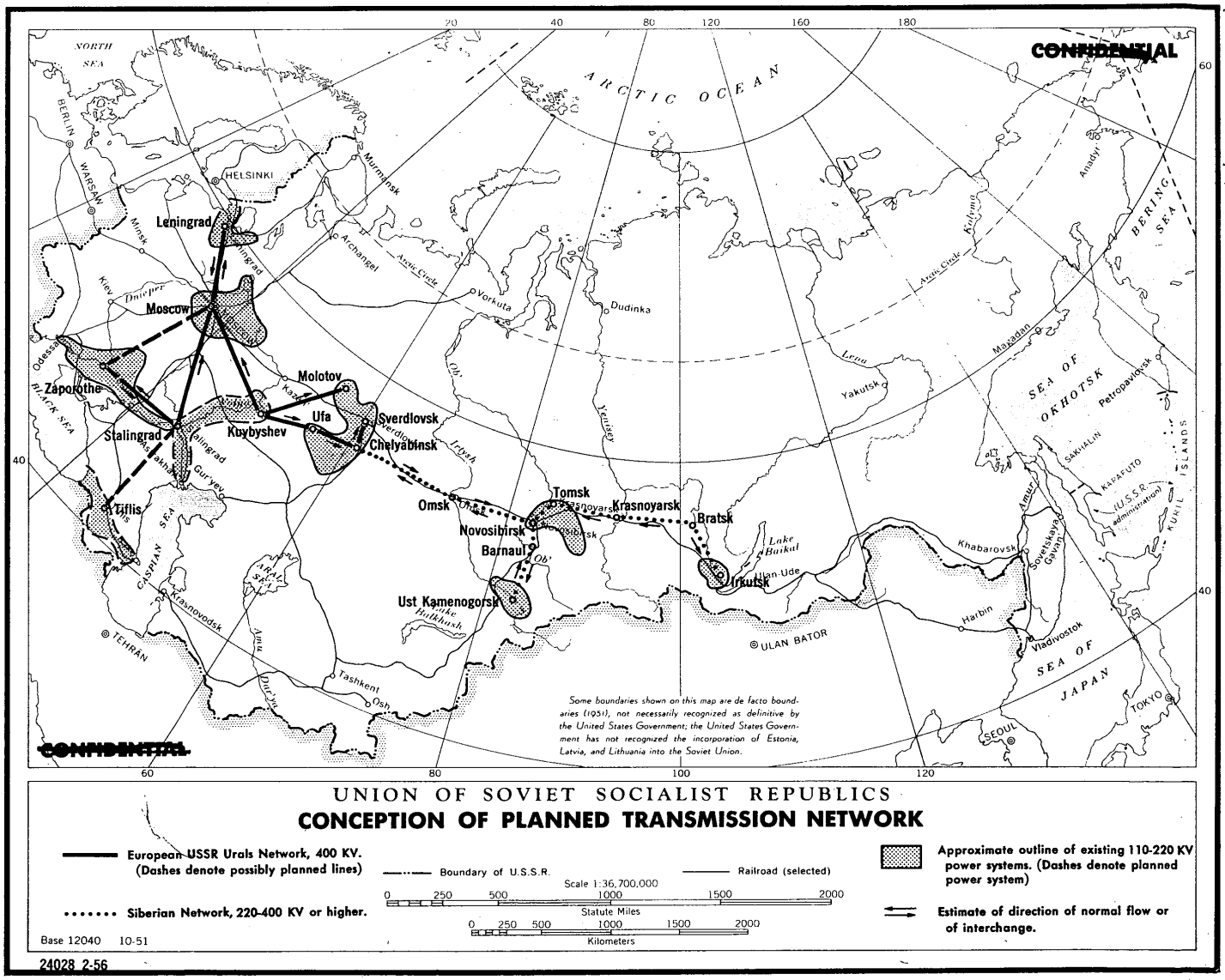
15. CIA. FBIS Economic Item 74283, Moscow, Home, 25 Sep 55, OFF USE
    CIA. FBIS Economic Item 48078, Moscow TASS, 17 Apr 55 OFF USE
16. Ibid.
17. CIA. FBIS Daily Report, 15 Dec 55, p. DD-16, OFF USE
18. CIA. FBIS Economic Item 74283, Moscow, Home, 25 Sep 55, OFF USE
19. Pravda, 24 Nov 55, U
20. Ibid.



UNION OF SOVIET SOCIALIST REPUBLICS

CONCEPTION OF PLANNED TRANSMISSION NETWORK

European USSR Urals Network, 400 KV. (Dashes denote possibly planned lines)

Siberian Network, 220-400 KV or higher.

Boundary of U.S.S.R.

Railroad (selected)

Scale 1:36,700,000

0 250 500 1000 1500 2000 Statute Miles

0 250 500 1000 1500 2000 Kilometers

Approximate outline of existing 110-220 KV power systems. (Dashes denote planned power system)

Estimate of direction of normal flow or of interchange.

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