4870

MAIN FILE

JPRS: 4870

14 August 1961

SELECTED TRANSLATIONS ON USSR ELECTRIC POWER (10)

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
1636 CONNECTICUT AVENUE, N. W.
WASHINGTON 25, D. C.

F O R E W O R D

This publication was prepared under contract by the UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE, a federal government organization established to service the translation and research needs of the various government departments.

SUBSCRIBING REPOSITORIES

SS-R

Boston University
725 Commonwealth Avenue
Boston 15, Massachusetts

Univ. of British Columbia
Vancouver 8, Canada

General Library
University of California
Berkeley 4, California

Russian and East European Center
University of California
Los Angeles 24, California

The Russian Institute
Columbia University
431 West 117th Street
New York 27, New York

Council on Foreign Relations, Inc.
58 East 68th Street
New York 21, New York

Duke University Library
Durham, North Carolina

Florida State Univ. Library
Tallahassee, Florida

Univ. of Florida Library
Gainesville, Florida

Harvard College Library
Cambridge 38, Massachusetts

Russian Research Center
Harvard University
16 Dunster Street
Cambridge 38, Massachusetts

The Hoover Institution
Stanford University
Stanford, California

Indiana Univ. Library
Box 248
Bloomington, Indiana

State Univ. of Iowa Lib.
Iowa City, Iowa

Joint University Libraries
Nashville 5, Tennessee

University of Kansas Library
Lawrence, Kansas

Univ. of Miami Library
Coral Gables 46, Florida

Michigan State Univ. Library
East Lansing, Michigan

University of Michigan Lib.
Ann Arbor, Michigan

Univ. of Notre Dame Library
Notre Dame, Indiana

Ohio State Univ. Libraries
1858 Neil Avenue
Columbus 10, Ohio

Univ. of Oregon Library
Eugene, Oregon

Penn. State Univ. Library
University Park, Penn.

University of Pennsylvania
Philadelphia 4, Penn.

Continued

Univ. of Pittsburgh Library
Pittsburgh 13, Pennsylvania

Princeton Univ. Library
Princeton, New Jersey

McKissick Memorial Library
Univ. of South Carolina
Columbia 19, So. Carolina

Univ. of Southern Calif. Lib.
University Park
Los Angeles 7, California

Syracuse University Library
Syracuse 10, New York

Tufts University Library
Medford, Massachusetts

Univ. of Vermont Library
Burlington, Vermont

Alderman Library
University of Virginia
Charlottesville, Virginia

Wayne State Univ. Lib.
Detroit 2, Michigan

Yale University Library
New Haven, Connecticut

Univ. of Washington Library
Seattle 5, Washington

JPRS: 4870

CSO: 1877-S/10

SELECTED TRANSLATIONS ON USSR ELECTRIC POWER (10)

[This report, published approximately monthly, contains selected translations on electric power in the USSR. Complete bibliographic information accompanies each article.]

TABLE OF CONTENTS

DEVELOPMENT OF INDUSTRY IN SOVIET ARMENIA DURING THE PAST FORTY YEARS -- By A. K. Dzhagatsnanyan, Yerevan, Izvestiya Akademii Nauk Armyanskoy SSR, November 1960, pp 11, 16-18.

Over 30 hydro-electric power stations have been constructed in Armenia during the past 40 years, including nine large stations such as Gyumushskaya, Kanakerskaya, Sevanskaya, Arzuinskaya, Atarbekyanskaya, Dzoragetskaya and others.

All large power stations are interconnected by means of high-voltage lines into one group -- the Armenian Power System.

Total output of electric power produced by all stations in Armenia was, in 1959, 2,688,000,000 kilowatt-hours. In comparison with 1913, electric power output in the republic increased 527-fold. The dynamics of the production of electric energy has been as follows:

Production of electric power in the Armenian SSR.

Year	Total output in millions of KW/hrs	Comparison (increase) with preceeding periods (in percentages)
1913	5.1	--
1940	395.3	77 times
1945	450.0	113.9
1950	949.3	211.0
1955	2,214.7	233.2
1959	2,628.0	119.0

During the pre-war years the output of electric power in the Armenian SSR increased more rapidly than the average increase in the whole of the USSR. Thus, 1940 production was 77 times as great as that of 1913, while the increase in the country as a whole was only 25 times as great as that of 1913. Our output of electric power overtook the development of industry and agriculture. The 77-fold 1913-1940 increase in the growth of electric power output corresponds to the growth of the gross industrial production at a rate of 8.7 times that of 1913. This created definite reserves of electric power and resulted

in the development in Armenia of the chemical industry, which consumes up to two-thirds of the electric energy produced in the republic, even at present.

The production and consumption of electric power are important indications characterizing the level of development of the production forces and industry in a country. In this respect the Armenian SSR has more electricity per capita than France, Italy, or Japan, not to mention Turkey and Iraq, which are far behind.

In view of the supply of natural gas to Armenia from the sister republic of Azerbaydzhan, the electric power status of the republic will be substantially altered. At present, 98% of electric power is produced by hydroelectric power stations. Upon completion of the Seven Year Plan this production will be reduced to 30%. Construction of a number of thermal electric plants using natural gas will result in a predominance of thermal electric energy. Furthermore, in view of the recent linkage of the high-voltage power systems of Armenia and Azerbaydzhan, our republic will obtain certain additional amounts of electric power for the development of agriculture and industry.

These important changes in the electric power status will make it possible to reduce to one-third the emptying of the age-old water reserves of Lake Sevan. This will be an important step forward in the measures being taken in the direction of maintaining the lake close to its natural high-water level.

GAES (Water storage electric power stations) -- By Ye. Loktionov, Moscow, Ekonomicheskaya Gazeta, 30 March 1961

Engineer G. N. Avdeyev from the Gidroproekt Institute and I are studying a diagram of a day's consumption of electricity in the Central United Power System. At one point the horizontal line designating the midday consumption abruptly drops and then rapidly rises.

It is significant that with the continuing increase of the production of electric power the "peak" of consumption will also continue to rise. This is no paradox. On the one hand it would seem that shortening of the work day and abolition of the high shift should be followed by curtailment in the consumption of electricity but instead more electricity is required for electrification of agriculture and for the needs of communal activities and every-day life.

The problem of "peak" consumption is further complicated by the wide utilization of thermo-electric power stations, continuously operating tubular boilers, heavy-duty power machinery and higher parameter steam.

What is the way out of this "deadlock"?

Specialists-power-engineers offer various solutions. For example, one of them considers it possible to utilize for this purpose a system of longer east-to-west transmissions, in which case electric power will follow the sun. This solution, however, would involve substantial losses of power.

Therefore, many specialists advocate creation within the power systems of new highly-maneuverable stations capable of carrying short-period loads. Particularly emphasized are gas-driven turbine and gas-driven steam-turbine installations. Unfortunately, however, the capacity of such units is rather inadequate and there is not hope as yet for an increase.

It would be ideal, of course, if the energy generated during the hours of "drop" could be conserved for use during the "peak" hours. So-called water-storage electric stations can solve this problem successfully. Such stations exist in many countries (German Democratic Republic, France, Czechoslovakia, Canada, the United States and others) and their number invariably continues to grow.

....At night when there is surplus power at the thermo-electric power stations, the GAES pumps the water from the lower reservoir to the upper reservoir. During the morning and evening when the "peak" hours set in, the water goes in a reverse direction. Falling from a great height, the water itself generates energy to replace the power expended when pumping the water up during the night. Operations of the GAES reach 65-70% efficiency.

The Gidroproekt Institute developed a rough design of a water-storage electric power station for Mosenergo. It will be constructed in the area of Zagorsk on the Kun'ya River. The river bed, with its high gently-sloping banks, will serve as a lower reservoir, while an artificial lake with 14 million cubic meters of water will be created on one of the shores to serve as an upper reservoir. Eleven million cubic meters of water will constantly circulate "up-and-down."

The difference between the levels of the upper and lower reservoirs will be approximately 100 m.

Unique equipment called reversible turbines will be used in the Zagorsk GAES. When the water is transferred to the upper reservoir they will act as suction pumps, whereas they will act as power-producing turbines

when the water is dropping into the lower reservoir. Total capacity of the station will be 585,000 KW. The station could deliver this amount of power for five hours.

The power supplied by the new water-storage electric power station will be much cheaper than the power that could be delivered from a new thermo-electric power station.

Another advantage of the station is that it can maintain a constant frequency, which is very important in the operation of industrial equipment. The station is also an effective emergency stand-by reserve which can be actuated easily and quickly when needed.

At present the Gidroproekt Institute is developing a number of other water-storage electric station promects, including those for the Chelyabinska and Orenburga power systems.

CREATION OF COMMUNISM'S MATERIAL AND TECHNICAL BASE AND THE MEANS OF RAISING EFFECTIVENESS OF CAPITAL INVESTMENTS -- By T. Khachaturov, member-correspondent, Academy of Sciences USSR, Moscow, Voprosy Ekonomiki, No 4, April 1961, pp 15, 20-21.

The major economic advantage of electrification is concentration of the production of electric power in large power stations and supply to thousands of consumers in large areas from one centre. The advantage of using electricity for power is also predicated on utilization of the cheap sources of energy, including waterfalls, wind, etc. The socialist system of economy permits full utilization of the major advantage of electrification, i.e., centralization of the production of electric power in large regional electric power stations which are amalgamated in electric power systems. Approximately 90% of all electric power produced in the USSR is put out by the rayon power stations. Every centrally produced kilowatt-hour of electric energy delivered to the consumer requires less capital investment and lower operating expense than that delivered to the consumer from an isolated local installation. Capital investment in one kilowatt of standard voltage and the cost of generation of energy at small electric power stations are 5-10 times as high as that at the large stations.

Concentration of electric power production at the large electric power stations will increase further in the

process of creation of communism's material and technical base. Thermal electric stations of 1,200,000 and 2,400,000 KW capacity and hydro-electric power stations of capacities in excess of 5,000,000 KW are being designed and/or constructed at present. Capacity of the machinery is also being increased accordingly: steam turbines of 300,000 KW capacity are in operation, while 600,000 KW turbines are in construction and 1,000,000 KW turbines are being designed and will be the equivalent of two Dneprogeses in one assembly. Capacities of hydro-turbines are also being raised: 100,000 KW capacity hydro-turbines were installed at the Kuybyshev Hydro-Electric Power Station; 110,000KW -- at the Stalingrad Station; new 200,000 KW turbines are being constructed for the Bratsk Station and 500,000 KW turbines are being designed for the Krasnoyarsk Station, while new-- possibly one million kilowatt capacity -- turbines will be installed in the giant future Lena Hydro-Electric Power Station.

Increase in the output of the stations and turbines brings about the reduction of relative capital investments as well as of production costs. Thus, specific capital investment in thermal stations of 2,400,000 KW capacity is 20% lower than that in 600,000 KW stations; capital investment in 600,000 KW units is 17% lower than that in 150,000 KW units. Specific capital investments also decrease in proportion to the increase in the output of hydro-electric power stations being constructed. Specific capital investments in the construction of larger hydro-electric power stations of 3,500,000 - 6,000,000 KW capacity are 50-60% lower than those in hydro-electric power stations of 100,000 KW. In general, specific capital investments during the present seven-year period in the power capacity of the thermal electric power stations are 24% lower than in 1958 and of the hydro-electric power stations -- 53% lower than in 1958.

Concentration of the production of electric energy results not only in reduction of specific capital investments but also in decrease in the cost of production. The cost of power production at the thermal electric power stations being put into operation during the current Seven Year Plan will be 27% lower than that at the stations which operated in 1958, while at hydro-electric power stations it sill be 53% lower.

The average reduction in the cost of electric power of 5 to 7% annually saves tens of millions of rubles. However, economic effectiveness of large power stations is not limited to the above. Electrification permits modernization of technology in all branches of production, in-

cluding agriculture, in all rayons of the country. Electrification promotes the growth of productive labor in all areas of the national economy and -- first of all -- in industry. The influence of electrification of labor on the increase of its productivity is vividly illustrated by the following data (1940 = 100%):

	1955	1959
Electrification of labor in industry	225	275
Productivity of labor in industry	198	257

During the years 1950 through 1959 both electrification and productivity of labor in USSR industry grew at approximately the same rate -- 7% per year. Considering that wages constitute approximately 20% of total industrial production costs, the net annual decrease in the costs which resulted from the 7% increase in labor productivity will exceed two billion rubles annually. Of course it will not be fair to attribute the entire saving to the growth of electrification; however, there is no doubt that there is a definite correlation between the increase in electrification and the rise in labor productivity, and a great portion of the savings derived from the reduced costs of production in the national economy must be considered to be a result of electrification.

MORE ELECTRIC POWER FOR AGRICULTURE! -- Moscow, Elektricheskaya i teplovoznaya tyaga, No 4, April 1961, pp 3-4

Last February the Central Committee of the CPSU AND the USSR Council of Ministers considered the question of electrification of agriculture in the USSR for the years 1961-1965. Having noted the increased rate of electrification of agriculture during past years, the CC of the Party and USSR Council of Ministers set goals for the further broad-scale electrification of agriculture to be based on more economical sources of power supply, including traction sub-stations of the electrified sectors of railroads.

It has been decided to instruct the ministries of Transport and of Transport Construction to allow for furnishing electric power to kolkhozes, sovkhozes, maintenance and repair stations, rayon centers and other consumers at a particular point or in the surrounding area, when planning or constructing traction sub-stations in the electrified sectors of the railroads.

The giant scale of electrification of railroads in our country opens up really broad possibilities for electrification of agriculture. Even at present, many thousands of villager-consumers receive cheap electric power from traction sub-stations and railroad power stations. Railroad transport furnished the kolkhoz village about 300,000,000 kilowatt/hours of electric energy last year.

Rayon consumers -- including agriculture -- occupy an important place in the electrical balance of such railroads as the Stalinskaya, Omskaya, Kuybyshevskaya, East-Skberain and others. Suffice it to say that in 1960 the traction sub-stations of the Stalinskaya Railroad delivered to agriculture approximately 60 million KW/hrs, Omskaya -- about 57 million KW/hrs, Kuybyshevskaya -- 22 million KW/hrs, etc. In Omskaya Oblast 43 kolkhozes and 19 sovkhozes receive power from railroad sources. Traction sub-station Kormilovka of this railroad supplies electric power to the nationally famous "Pobeditel" Sovkhoz, while traction sub-station Luzino supplies the large hog sovkhoz of the same name.

The resolution of the CC of the CPSU and Council of Ministers of the USSR on electrification of agriculture met with enthusiastic response from all electrical and power engineers of the railroads. Assistance received by agriculture from electrical installation personnel increases every day. Only recently the traction sub-stations of electrified railroads began supplying electric power to Dovol'nenskiy Rayon of Novosibirskaya Oblast, 80 km away, and Okoneshkovksiy and Shcherbakovskiy rayons of Omskaya Oblast, which are 30-40 km away from the railway line.

As a result of electrification of the Ryazan'-Sasovo of the Moscow Railroad, the "Gorodskoy" Sovkhoz and several nearby kolkhozes hooked up to traction sub-station Listviyanka. Traction sub-stations Perevles and Nazarovka provide electric current to farms and residences of kolkhoz workers. A kolkhoz settlement and a sovkhoz located near Rybnoye Station also obtained electricity.

Upon completion of electrification of the Orel-Kursk section of the railroad, sub-stations Ponyri and Vazy began supplying electric power to kolkhozes imeni Lenin, imeni Kalinin and "Put' Kommunizma." Several additional high-voltage lines will be put in operation in this section this year. They will furnish electric current to a number of other kolkhozes.

Extensive work is being conducted on the organization of supplying electric power to agricultural consumers by the Latviyskaya, Severnaya, Gor'kovskaya, Yugo-Zapadnaya, L'vovskaya and other railroads.

During the remaining years of the current Seven Year Plan the electrification men are faced with the prospect of electrification of 15,000 km of railway lines including such routes as Moscow-Gor'kiy-Kirov-Balezino-Perm'-Sverdlovsk; Karaganda-Magnitogorsk-Ufa; Moscow-Leningrad; Moscow-Kiev; Ryazan'-Ryazhsk-Voronezh-Rostov-Mineral'nye Vody; Altayskaya-Artyshta-Abakan-Tayshet-Bratsk and others. A number of electrified lines will pass through the virgin land regions.

This means that many more thousands of kolkhozes and sovkhozes can obtain electric power. It is important to ascertain fully and in time the needs of agricultural consumers so as to enable each section being electrified to provide for these requirements during the planning stage. Moreover, it is necessary to make corrections in the previously designed construction plans of the proposed traction sub-stations, in line with the above-mentioned resolution.

It is necessary to point out that agriculture's demand for electric power increased constantly. Tentative calculations of the Teploelektroproyekt Institute show that the power load requirements of agriculture may be in the order of 100-200 KW per 1 km of electrified railway line.

Substantial amounts will be required by agriculture, particularly in 35-kv voltage. In the near future, i.e. in the years 1965-1970, it is proposed to connect agricultural loads in this voltage with individual traction substations in a volume reaching 8,000-12,000 KW.

It seems that the future consumption of 35 kv energy will increase further since the Ministry of Agriculture USSR is planning a changeover to the application of a system of distribution of 35 kv power suppoy with direct conversion to 400 volts, in a number of regions throughout the country. According to available data this would afford a 30-40% reduction in the amount of electric wiring and the number of transformers required for electrification of agriculture.

Apart from agriculture there will be other rayonal demands for electric power. It is the responsibility of the sovnarkhozes to take into account the interests of all the rayon consumers who will be served by the traction substations and to provide the planning organizations with all pertinent data.

The resolution of the CC of the Party and the USSR Council of Ministers fully clarifies the question of the sources of financing and method of providing the necessary materials to facilitate the work on hooking-up rayon con-

sumers to the traction sub-stations. Thus, where rayon consumption is less than 25% of the total capacity of traction sub-stations, 6-10 kv delivery cells for feeding the rayon and agricultural consumers are constructed and equipped with funds earmarked for electrification of railroads. Where greater capacity is needed and 35 kv and higher voltage are required by the rayon consumers, all the expenses for installation of distribution equipment at traction sub-stations are paid from the capital investments and funds earmarked for materials, equipment and cable fabrication by interested organizations.

Installation of transformers at traction sub-stations being built, construction of outlets and distributors for 6-10, 35 and 110 kv for meeting the needs of the rayon consumers is the responsibility of the Ministry of Transport Construction which acts on recommendations of the Ministry of Transport.

Completion of construction, expansion or reconstruction of operating traction sub-stations with a view toward using them for supplying the rayon consumers will be carried out by the Ministry of Transport with funds earmarked for equipment and materials by the interested organizations. Planning of the job is as a rule entrusted to the organization which originally designed the given sub-station.

Departments of electrification and power administration of the railroads should prepare suitable technical conditions for hooking-up the rayon consumers to such sub-stations and should consider the question thoroughly and seriously without impeding the set goal.

It must be pointed out that in many cases the rayon consumers, including agricultural, delay the construction of the required networks and lines for connection with the traction sub-station. The step-down transformers at more than 100 traction sub-stations already have a third winding on 35 kv voltage which is especially made for the rayon consumers. However, not all of the transformers are being utilized. Such a situation, for instance, exists at traction sub-stations in the sector Kinel'-Dema of the Kuybyshevskaya Railroad; Kharkov-Lozovaya, Kharkov-Belgorod and Lozovaya-Slavyansk of the Southern RR; Nizhnedneprovsk-Chaplino of the Stalinskaya RR, and other railroads.

It is estimated that 1,300 km of rural electric networks will be constructed during the current Seven Year Plan. It is a vast program and its implementaiion will require all of the effort of the constructors and workers of the electro-technical industry as well as the consumers of the electric power themselves. The resolution of the CC of the Party and the USSR Council of Ministers must

stimulate the organizations concerned in the union republics as well as in the sovnarkhozes to expedite the solution of the questions connected with supplying the rayon consumers with electric energy from traction sub-stations.

Besides the traction sub-stations agriculture receives (and will shortly receive greater amounts of) electric power from railroad electric stations, step-down substations and longitudinal power transmission lines. As we know, a number of railroads are constructing longitudinal 10 kv lines, while additional wires are being installed on the poles of the contact network in the electrified alternating current sectors. These wires, together with the rail (ground) create a three-phase system of 27.5 kv electric supply. These longitudinal lines are intended to feed all line consumers including railroad buildings, platelayers' cabins, residences of railroad workers and also track maintenance operations.

There already are 5,000 km of longitudinal electric-supply lines. Approximately 3,000 km more are being activated this year and the length of these lines along railroads will continue to increase constantly. This will also facilitate the supplying of kolkhozes and villages located along the railway lines. In certain cases the poles and other supports of the railroad electric networks could be utilized for hanging the wires of electric lines intended for feeding the kolkhozes, sovkhozes and other agricultural consumers.

In order to utilize the expanding potential more fully, the aid of electro-technical industrial plants must be secured. They are being called upon to organize delivery of electrical equipment required to connect the consumers with the railroad sub-stations and the lines of longitudinal electric supply. The above particularly applies to plants fabricating less powerful transformers of 10 and 22.5 kv voltages. It should be noted that unfortunately, production of 27.5 kv transformers in 20 and 40 KW capacities has not yet been organized, although they are badly needed for electrification of the line consumers in the sections of alternating current and can also be used for electrification of agricultural consumers.

All is not well in the production of powerful step-down transformers for traction sub-stations of alternating current of 27.5 kv, which are intended for the feeding of inter-system 220 kv power transmission lines. In addition to two coils -- 220 and 27.5 kv for traction -- such transformers should have a third coil (voltage 35 or 10 kv) for feeding the rayon. However, for cost reasons the Moscow Electric Plant is trying to refuse to manufacture three-

coil transformers and offers instead to utilize separate transformers which can be connected with the traction coil of 27.5 kv. Obviously, the plant does not realize that this will raise overall costs and increase the power loss which results from double-transformation of energy.

It is imperative that the USSR Gosplan make a final desision determining definitely which plants will manufacture low capacity transformers for 27.5 kv and which will furnish large capacity transformers for 220 kv.

Life insistently demands the solution of certain other important problems. In many cases there is much in common in the solution of the problems of village electrification and electrification of line consumers of railway transport. Consequently, it would seem advisable to manufacture single type multi-purpose machinery which would permit application of modern industrial methods in construction and installation operations. There is also a real possibility of unification of the construction of network circuit breakers, automatic multi-switch separators, and of a universal solution to the problem of automatic regulation of voltage under load for transformers of comparatively small capacity, etc.

The Party and government have placed before the Soviet people a task of great national importance. To furnish electric power to agriculture means to lend very real aid in the complete mechanization of agricultural production, i.e. -- to further raise its economic level.

The railroad transport service has considerable potential with which to expedite electrification of agricultural consumers. It is the duty of all railroad men to bring this potential into being.

THE KRASNOYARSK HYDRO-ELECTRIC POWER STATION -- By Engineer B. P. Feringer, Moscow, Gidrotekhnicheskoye Stroitel'stvo, No 5, May 1961, pp 2-5

The dam of the Krasnoyarsk Hydro-Electric Station is located above the city of Krasnoyarsk at the point where the river flows through a comparatively narrow valley with the steep and high banks lined with granite. The width of the river (between the actual water lines) does not exceed 750 meters. The area of the catch basin within the fold consists of 288,000 sq km, mean long-term flow is 2,800 cubic meters per second, maximum recorded flow during spring floods is 29,800 cubic meters per second, while at the end

of winter waterflow has been recorded at 300-400 cubic meters per second.

The hydro-electric system will create a 100 m affluent and a storage reservoir 380 km long and approximately 2,000 sq km in area with a gross volume of 73 cubic kilometers and the actual working volume of 30 cu km.

The original plans of 1957 envisaged construction of a concrete dam of the solid gravitational type with expanded joints. At the present time the Leningrad branch of the Gidroenergoproyekt (Hydro-Electric Power Planning Administration) has developed a new design of the hydro-electric station. Clarification of the planning of long-term utilization of electric power resulted in a decision calling for a practicable increase of the specified capacity of the Krasnoyarsk Hydro-Electric Power Station to the minimum of 5 million KW. Planning and research projects by the Leningrad Metal Plant and the "Elektrosila" Plant solved the problem of bringing the unit capacity of the plants up to 500 milliwatt with a very slight increase in the size of machinery. This permitted not only installation of ten units but provided for possible future installation of two additional assemblies in the building of the hydro-electric power station, in spite of the narrowness of the fold at the dam site and the erected bulkhead on the left bank, without lengthening the building.

The adopted design of the dam was of a massive-abutment type which afforded a considerable saving in the amount of concrete work. For the first time the entire operation of manufacture, transportation and laying of the long concrete blocks within the dam was designed to be done by a continuous assembly line method. Unique 25-ton bridge-type cable-cranes of 1100 m span will serve as a general hoisting-transportation-construction assembly, which should be produced by USSR industry within the next two years. Thus, the dam will be built without trestle or pier for transporting cement.

An original solution was proposed on the construction of ship-raising machinery consisting of a slanting ship elevator with a turn-table bridge, thus affording maximum utilization of the local topography which greatly reduced the cost of the ship elevator and made it possible to construct it simultaneously with the rest of the hydro-electric power plant.

One of the complicated problems encountered while increasing the unit capacity of the hydro-electric plants up to 500 milliwatts was the question of water supply for the turbines with the calculated head (with allowance for water hammer) of up to 130 m and the delivery of 580 cu

meters per second. The uncertainty of combining the metal casing and steel reinforcement in the concrete and lack of dependable specifications for the stress-reinforced constructions of this type as well as the labor-consuming nature of this work will compel application of a spiral metal chamber and a steel pipeline. The spiral chamber is round in its cross-section with the entrance 8.5 m in diameter, and a wide-sweep angle of 345°. Specially alloyed steel up to 32 mm thick, will have to be used for its construction. Same type and size steel will be used for the lower level pipeline of 10 m diameter. The pipeline was designed to be open and will lie on the lower face of the dam abutment. The water intake openings of the ducts on the crown of the dam will be equipped with removable strainers and locks equipped with hydraulic lifts. A recess will be constructed in front of the locks for installation of a dam walling in case it becomes necessary to empty the working channel. The servicing of all installations of the dam is accomplished by a gantry crane of 150 ton capacity.

The building of the hydro-electric power station has a 4 m high engine room with a hatch and a trap door in the ceiling over each generator. A 1,000-ton capacity gantry crane is installed over the roof of the engine room. The crane is equipped with a housing which completely covers the hatch when the trap door is open, so as to protect the engine room from the cold air and atmospheric precipitation. The adopted arrangement solves the problem of transporting the transformers from the place of their installation over the suction pipes, to the transformer repair shop located next to the assembly platform. A special wagon is used for this purpose. It moves on the rails of the gantry crane.

The hook-up of the Krasnoyarsk Hydro-Electric Station with the power system is accomplished on the voltage of 220 and 500 kilovolts. Four plants will operate for the 220 kv network, and the other six plants (future plans call for eight plants) will operate for the 500 kv. The main 500 kv single-phase transformers will have the capacity of 200 millivolts each. For the 220 voltage two three-phase 300 millivolt transformers are installed for each generator. The transformers will be connected by means of overhead lines, with the 220 and 500 kv ORU located on the left and right banks of the river.

The 590 millivolt capacity generators designed for the Krasnoyarsk Hydro-Electric Power Station, with generating capacity of 15.75 kv and speed of 93.8 RPM are of an umbrella type with a step-bearing support on the lid of the turbine.

The creation of such a powerful generator in a size

suitable for transporting and assembly necessitated application of a water cooling system for the wiring of the stator and forced-air cooling system for the rotor, which made it possible to reduce the bulk and weight of the machinery to 62.5% of the standard-type generator. Under the operating conditions of the system, the generator excitation is ionic with the feeding from an auxiliary unit.

The Leningrad Metal Plant developed a new type of high-speed runners for the radial-axis turbines of this power station. An increase in the relative height of the guiding device and improvement in the shape of the rotors made it possible to raise the output to 1,100 L/sec (30% higher than the first turbines of the Bratsk Hydro-Electric Power Station), thus reducing the diameter of the runner by 1 m. The turbine has a diameter of 7.5 m, speed of 93.8 RPM, capacity of 508 milliwatt (with a 95 m head and delivery of 580 cubic meters per second) and maximum efficiency of 94%. It has been decided that the turbine runners, weighing 250 tons each, are to be all-welded and to be delivered undismantled via the White Sea-Baltic Waterway, the Northern Seaway and the Yenisey River.

ELECTRIFICATION OF AGRICULTURE -- Moscow, Promyshlennaya Energetika, No 5, May 1961, pp 1-3

With a general increase of 38% in the supply of electric power in the USSR from 1956 to 1959, power consumption by agriculture increased during the same period by 65%. The supply of power to agriculture by the state and large industrial power stations has also increased.

Of the total supply of electric power in the USSR, 3% is used by agriculture; this situation is analogous to that in the United States, Austria and Switzerland.

Utilization of electric power for agricultural needs in France, the German Federal Republic, Hungary and Greece is under 2% of the total power production in these countries.

In January and February 1961, personnel of the plant and factory inspectorates of the power systems of the Sovnarkhozes and State Agricultural Power Control inspected 31 electric stations and 57 areas of agricultural power networks in the following 12 economic rayons: Moskovskiy, Tul'skiy, Leningradskiy, Gor'kovskiy, Rostovskiy, Krasnodarskiy, Dneprovskiy, Kiyevskiy, Khar'kovskiy, Sverdlovskiy, Chelyabinskiy, and the Belorusskiy. It was determined that the problems of electrification of agriculture

are being solved mostly by the oblast branches of Sel'energo which control, as a rule, the construction and installation agencies of Sel'elektostroy; however, there are areas where the construction and installation agencies engaged in the electrification of agriculture operate independently.

The activities of Sel'energo in the area of electrification are confined to operations and development of electric power networks and major sub-stations of 35,10, and 6 kilo-volts; the electric power networks and all electric installations of 0.38-0.22 kv voltage are assigned to the kolkhozes and sovkhozes which operate them.

Operations of the 35, 10, and 6 kv agricultural networks in Tul'skaya Oblast are under the control of the power administration of the Tul'skiy Sovnarkhoz.

The number of electrified farms and in individual rayons is high: the sovkhozes and private manual telephone exchanges are 100% electrified, while the kolkhozes of the Ural'skiy, Moscow, Leningradskiy, Khar'kovskiy and Rostovskiy rayons are 90% to 98% electrified. However, the number of electrified formsteads in the kolkhozes is much lower. Even Tul'skiy Rayon with its developed state electric power distribution networks has only an insignificant number of its kolkhoz farmsteads electrified.

Electrification of agricultural labor in the USSR is four times as high in sovkhozes as it is in kolkhozes. Furthermore, electrification of labor in the sovkhozes and kolkhozes which receive their electric power from the state power systems is 50% higher than that in the sovkhozes and kolkhozes which receive it from the small village power stations. Of the surveyed regions the highest degree of electrification of agricultural labor is in the Moskovskaya, Chelyabinskaya, Leningradskaya and Sverdlovskaya oblasts, and the lowest -- in Pskovskaya and Novgoradskaya oblasts.

The total number of hours of operation of individual village power stations is extremely low and was as follows in 1960: Tul'skaya oblast -- 1,300 hours, Rostovskaya oblast -- 1,600 hrs, Krasnodarskiy Kray -- 1,780 hrs, and Sverdlovsksya Oblast -- 1,160 hrs.

The technical state of the electric power networks and sub-stations belonging to Sel'energo is comparatively satisfactory with the exception of those networks and sub-stations which were in operation for long periods of time and require a complete overhaul necessitated by the rotting wood of the power poles, corrosion of metals, inadequacy of wiring for the increased loads, existence of the CPZ system (two lines -- ground) and antiquated machinery and equipment.

The 6-10 kv power networks and sub-stations of the low voltage distribution networks belonging to the sovkhozes and kolkhozes are often in a less satisfactory condition.

Supplying agriculture consumers is usually effected through the radial type distribution network. At the present time work is underway on interconnection of the circuits of various networks. However, change-over of the power networks from one source of supply to another requires from five minutes to two hours and in certain cases the change-over is completely impossible due to the distance from the main sources of supply and the transmission inadequacy of the lines.

In the Leningradskaya Oblast Sel'energo agricultural consumers are divided in respect to reliability of the power supply into three categories: the first category, which does not allow interruptions, includes power milking machines, incubation stations, starch plants and the waterworks; the second category permits interruption during switching-over to reserve supply: feed manufacturers, grain elevators; the third category permits shut-down for a duration not exceeding 24 hours: feed mills, machine shops and woodworking shops, concrete mixers and the waterworks (where storage tanks are available.)

In order to insure a continuous flow of power to the agricultural installations which cannot be switched off without damage or destruction to production (incubator stations, milk pasteurization, etc.), portable diesel power plants are usually employed.

THE INGURI CASCADE -- By B. Abramov, Moscow, Stroitel'naya Gazeta, 17 May 1961, p 4.

The beautiful Inguri has its source high in the mountains near the Ukhvan and Shkhara glaciers. Its turbulent waters rush down the deep gorge between the Caucasus, Kodorskiy and Svanetskiy ranges and then cut across Kolkhidskaya plain toward the Black Sea.

For a long time people were dreaming of the possibility of making the river work for them and protect the surrounding fertile lands from the dreaded floods. Even prior to the First World War the Tsarist government let foreigners have the concession of designing, constructing and operating the electric power station project on the Inguri river. However, this work was not completed.

The solution of this complicated problem became pos-

sible only during the Soviet period. The construction of the Transcaucasus' largest hydro-electric power complex on the Inguri river has recently commenced at a point 35 km from the town of Zugdidi.

The chain of the water power structures will begin near the village of Dzhavari.

The reinforced concrete arc-type dam, of a unique height of 300 meters, will be erected on the Inguri, in the narrow section of the gorge. The water will rush from the reservoir created by the dam into the pressure tunnel. There, the water will be subjected to a tremendous pressure, which will force it onto the rotors of the turbines which will be installed in the engine room deep underground. Here will be the realm of power engineering. The hydraulic machinery control panel, oil-pressure installation, overhead cranes and other equipment will be set up in an orderly formation in the underground palace.

From the turbines the water from the Inguri will go through the discharge tunnel and will come up to the surface to join with another river -- the Iris-Tskali. The Perepadnaya Hydro-Electric Power Station will be constructed on the spillway of these two rivers, while yet another hydro-electric generating station will be built on the 20 km of take flowing into the Black Sea. Thus, the Inguri complex will include three hydro-electric power stations. Their total capacity will be 1,632,000 KW.

Construction of the Inguri Hydro-Electric System is just beginning. Building of the living quarters, warehouse facilities and roads is underway. The first tasks will be the extension to the jobsite of the power transmission line and a railroad spur from Zugdidi and construction of a bridge across the Inguri near the village of Dzhvari.

For the purpose of reducing costs and expediting construction, the most progressive construction methods will be applied and the cheapest materials and most modern machinery will be used. Construction of an arc-type dam -- instead of the usual gravity dam -- will reduce the required quantity of concrete by 75%.

The selection of drop type open hydro-electric stations will eliminate the necessity of constructing expensive engine rooms, because the machinery will be installed in the open.

The passage of a few years will make the area of the ancient village of Dzhvari unrecognizable. Facilities of the mighty water power complex will spread out for kilometers around. Vast blue expanses of the new water reservoirs will cover wide areas and a new city will emerge

amidst the greenery of lush vegetation. Its main street will be almost two kilometers long.

Power transmission lines will extend from the water power station carrying high-voltage electricity of 500,000 v. Such lines are new to Georgia.

The Inguri complex will develop over five million kilowatt/hours of electric energy annually, which is almost twice as much as the amount now produced by all hydro-electric stations in the republic. This will stimulate labor-consuming production, expand the existing capacity of industrial enterprises, permit an increase in the utilization of electric power in Armenia and Azerbaydzhan, whose power systems are already amalgamated with that of Georgia.

Moreover, construction of the Inguri hydro-complex will create favorable conditions for the development of agriculture on the Kolkhidskaya Plain. 20,000 hectares of fertile land will be irrigated between the Inguri and Okumi rivers.

The Inguri Hydro-Electric Power Station is only the beginning of utilization of the vast potential water-power resources of the river. Seven more hydro-electric power stations will be constructed on the Inguri River in the future.

TO START THE STATION ON TIME -- Moscow, Trud, 23 May 1961.

The construction of a new high-voltage thermo-electric power station is underway in the Lithuanian Republic. The new GRES will supply cheap electric power to the Baltic territories and Leningradskaya and Kaliningradskaya Oblasts.

The first plant of the electric power station is scheduled to start output of industrial power in 1962. In order to accomplish this the builders will have to move 3,500,000 cubic meters of earth, pour over 18,000 cubic meters of solid concrete and reinforced concrete, erect 40,000 cubic meters of prefabricated reinforced concrete structures and manufacture 1,300 tons of metal strcctures.

We are now having warm May weather which is ideal for work. And yet everything is quiet at the construction site. Why? Not enough excavation equipment, dump trucks, reinforced concrete structures and lack of a lot of other materials and equipment.

Two months ago newspaper Sovetskaya Litva published an interview with I. T. Novikov, Minister of Construction

of Electric Power Stations USSR. We were particularly impressed with a report regarding the steps being taken by the Ministry with regard to providing the construction site with the necessary equipment and materials. It was mentioned, for example, that twenty trucks, ten excavators, cranes and other equipment were to be urgently dispatched to the site. But where are they? For excavation work for the main building, seven excavators of one cubic-meter capacity each should be working simultaneously, but there are only three. This has resulted in delaying the laying of the foundation.

We were told that for the sake of expediting construction and reducing costs the GRES had allotted portable installations and prefabricated buildings, including an electric maintenance and repair shop, plaster shop, paint station, and a welding laboratory. In reality there is nothing. Since it is impossible to work without these buildings, we are compelled to construct regular buildings which increases the cost and -- most important -- causes delays.

Our electric power station is being constructed with due consideration being given to the latest techniques. Enlarged reinforced concrete structures will be widely applied. We were very happy to hear that certain enterprises were instructed to furnish the above structures. However, the Dubrovskiy Production Combine of the Sevenergostroy Trust and Perovskiy Production Combine of the Mosenergostroy Trust do not fulfill their obligations very well. Their managers refused to fabricate the "500" reinforced concrete structures specified by the plans. The project is therefore being altered. Large expenses are incurred again.

In the interests of uninterrupted delivery of materials to the construction site we are laying a special railroad spur line from Vevis Station. Almost completed, the work had to be suspended because of non-delivery of 800 tons of rails. The Ministry gave orders to furnish the steel but Glavsnab reduced the quantity of the required rails to 600 tons. As a matter of interest, not one ton of rails has been received thus far. Perhaps this fact is a minor one but it characterizes the attitude of the Ministry workers to the needs of the electric power construction men.

The Lithuanian GRES, one of the largest projects of the Seven Year Plan, must be started on time. Our collective is resolutely prepared to greet the forthcoming 22nd Congress of the CPSU with new successes in our work. However, we expect the Ministry of Construction of Electric Power Stations USSR to create the conditions necessary for

a successful fulfillment of the accepted socialist obligations.

NEW RULES FOR TECHNICAL OPERATION OF POWER STATIONS AND NETWORKS -- Moscow, Energetik, No 5, 1961, pp 1-3

The new Rules for Technical Operation of Power Stations and Networks, approved by Soyuzglavenergo, (main power agency of USSR will soon be published.

The necessity for basic revision of the existing Rules published in 1953 has been apparent for some time, since the past eight years brought about a number of major changes in the country's power engineering. The capacity of electric power stations has increased by 150% mostly because of high-pressure installations whose share of the total capacity of electric stations reached 65%. The capacities of individual plants and electric stations, thermal as well as hydraulic, also rose sharply. Consolidation of power systems has developed extensively; a number of inter-system super-hgih voltage transit lines are in operation: Volga GES -- Moscow; Stalingrad GES -- Moscow; Volga GES -- the Urals. The nature of fuels used by electric power stations has changed: the use of gas and fuel oil has increased and coal of new origins is being used. Increase in steam parameters has necessitated more rigid specifications for the quality of feed water and utilization of salt-eliminating units (water softeners). Automation and mechanization of technological processes are being developed and newly perfected automatic control methods are being applied. Practice has showed that it is possible to extend the efficiency of the equipment between major overhauls.

Significant changes have taken place also in the organizational structure of power administration, particularly in connection with the transfer of electric power stations and networks to the supervision of sovkhozes.

Revision of the Rules of Technical Operations was done with broad participation of the workers of power organizations, who submitted over 6,000 comments and suggestions.

Substantial changes have been made with regard to acceptance of electro-stations for operation. The new Rules show that power installations can be, as a rule, accepted for industrial service only upon completion of all necessary tests and inspections and after elimination of all faults and defects.

More rigid requirements are established for the readiness of equipment prior to beginning of operation. For leading plants the period of complete testing is five days; for serial equipment the checking period is three days of operation at full capacity and with nominal steam and water parameters; automatic controls, technological safety, signal and obstruction-prevention devices, controls and gauges must be assembled and installed in complete accord with the design and are to be in operation simultaneously with the basic machinery. It is prohibited to conduct complete tests of power installations on the basis of temporary designs or drawings.

The new Rules formulate a number of important requirements relative to the eqiupment and its service, which are either being applied for the first time or summarize the accumulated experience in operations. Some of these requirements are mentioned in this article.

The rules establish that all new boilers with steam pressure in excels of 110 atmospheres are to be equipped with a device for injection of alkali-acid water treatment compound and conservation. The Rules explain how these operations are to be accomplished.

Thermal control, safety devices, signalization and automation mandatory for drum-type and continuously operating tubular boilers of steam capacity exceeding 50 tons per hour have been defined.

Boilers operating on sulfur fuel oil must be equipped with a device injecting an additive (fuel-oil treatment) into the furnace to lower the dew point of the smoke gasses. In addition the Rules formulate the requirements for combatting corrosion on the rear heating surfaces.

The requirements for ventilation of the boiler installations are made considerably more rigid as compared with the old rules. These are predicated on boiler capacity and the type of ash remover.

Another paragraph requires installations of an electric or pneumatic drive on all regulating and locking devices having operational purpose and also on all main steam and water valves.

An additional supplement called the Deaerator deals with basic conditions which insure reliable operation of deaerators of atmospheric and/or high pressures.

Also given in the Rules are the requirements dealing with the regulation and the safeguarding of turbines, tightness of safety valves, extent of automation and automatic starting of reserve pumps of turbine installations.

Organization of economical operation of water-cooling reservoirs and other cooling systems is also discussed.

Particularly significant changes in the Rules are in parts dealing with water treatment and water utilization. The importance of combatting metal corrosion, treatment of feed water with hydrazidine, organization of ejection of gasses from heat exchangers and heaters, anti-corrosive protective coating of the interior of boilers and tanks and water-treatment equipment is stressed.

Quality standards of steam and feed water are raised in respect to sodium chloride and silica content as well as content of oxygen and carbonic acid. New standards are being introduced in respect to iron and copper content in the feed water.

Requirements in respect to intra-station loss of steam and condensate and standards for boiler blow-downs have been lowered.

The Rules provide for application of special outfits to facilitate unloading of fuel, especially frozen fuel. Included are heaters for heating the fuel in freight cars, vibrators, etc.

In order to insure efficient work of conveyor belts and to preclude their stoppage, it is suggested that a temperature of no less than 15°C be maintained in the fuel-receiving area. Specifications for organization of bunkers and fuel lines are also given with a view to prevention of stoppages.

Fuel inventory is to be conducted quarterly at the fuel depots. Additional instructions are introduced to the effect that the waterworks installations must be of steel or cast steel manufacture and that these materials must be used on all new water installations, on all installations undergoing overhaul, on all installations in which water pressure exceeds 9 atmospheres, or where the pipe diameter is 350 mm or larger. With regard to steam lines, steel must be used when steam temperature exceeds 300°C, regardless of steam pressure or pipe diameter, and on steam lines of 200 mm diameter or larger, at pressure in excess of 9 atmospheres.

With reference to hydro-electric power stations the Rules revise the requirements relative to automatic controls of the speed (RPS's), frequency and capacity as well as group regulation, including requirements for heating grids in water inlets, changes in inspection, overhaul schedules, etc.

Additional rules are included on installation and operation of new types of electro-technical equipment: generators with hydrogen cooling systems, automatic transformers, air-switches and air-compressors pertaining thereto, oil-core high-voltage cables of 110/220 kilovolts, overhead power-transmission lines of 330-500 kv, etc.

The communications section of the Rules is revised to include a description of the means of communication for consolidated dispatching, power systems, city cable and thermal networks, with application of modern progressive installations and systems of communication.

Taking into consideration the widely popular methods of operating sub-stations and hydro-electric power stations with no constant attendance by duty personnel, the new Rules provide for simplification of the conditions for changing over and list the change-over switching operations which can be accomplished by one person. The Rules also simplify the system of recording change-overs.

The new Rules revise the question of periodic major overhauls on all types of equipment and provide for longer service between the overhauls.

With reference to the questions of organization, the Rules of Technical Operations invite initiative from the field and will receive suggestions toward simplification of administrative systems and consolidation of separate links, shops and even entire enterprises.

The Rules permit organization of a consolidated steam generation department, reduction in the number of the departments (shops) to two (steam power and electric power) at the stations of medium size, introduction in individual cases of general management (without shop or departmental administration), unification of several electric power stations under general management, etc. The list of industrial auxiliary departments of the power administrations has been revised and made accurate. A number of changes was introduced in the structure of the electric power system administration, while organization of mechanized repair stations (RMS) was scheduled.

These are some of the more important changes contained in the new Rules.

The Rules do not fully reflect the conditions of operating electric stations with multi-assembly equipment, because no adequate experience in operating such power stations is available.

The Rules of Technical Operations do not cover gas turbine, diesel and locomotive installations, or mobile electric power stations.

All other steam-turbine and hydro-electric stations, power distribution installations and overhead line networks of 1,000 volts and higher, as well as all cable and thermal networks, must operate in accordance with the new Rules of Technical Operations and compliance with these rules is compulsory for all sovkhozes, ministries and departments.

It is necessary for the power administrations to organize training of personnel in these new Rules and to check their knowledge. It is also necessary to plan steps for bringing the equipment and its operation in line with the requirements set forth by the above Rules.

There is no doubt that the new Rules for Technical Operation of Power-Stations and Networks will play an important role in the further improvement of the technical standards, economical reliability and efficiency of the electric power industry in our country.

EXPEDITE CONSTRUCTION OF THERMO-ELECTRIC POWER STATIONS -- By I. Dmitriyev, Deputy Chairman VSNKh, Moscow, Stroitel'naya Gazeta, 26 May 1961

The current Seven Year Plan is decisive in implementation of Lenin's idea of total electrification of the country. Particularly high development is expected in thermo-electric power. In 1965 thermo-electric power stations within the RSFSR will deliver 350 billion KW/ hr, i.e. twice as much as in 1958. Total power output to be produced during the seven years should be equal to that delivered during all preceeding years.

How can this giant problem be solved?

The first two years of the Seven Year Plan "left room for improvement." Electric current was delivered by the power plants at large thermo-electric stations under construction, namely: Troitskaya, Yuzhno-Ural'skaya, Kirovskaya, Tynmenskaya, Stavropol'skaya, Nevinnomysskaya, Novo-Ryazanskaya...The next two years should see the operation of some ten other powerful aggregates.

For some reasons (which should not have occurred), last year plans for operation of power plants did not materialize at the Nazarovskaya, Verkhne-Tagil'skaya and other GRES which are being constructed by organizations of the USSR Ministry of Construction of Electric Power Stations.

A considerable number of stations in the RSFSR are being constructed by sovkhozes. However, because of the previously prevalent old traditions the sovkhozes are slow in facing up to the importance of thermal energy.

Construction of power installations in the Omskiy Sovnarkhoz is particularly unsatisfactory. The job of expansion of TETs No 3 has been going on for three years. Installation of a 50,000 KW turbine and a 420 ton steam-

capacity boiler was planned for 1960. The Omsk constructors sabotaged this undertaking and made no preparation for putting this machinery in operation this year.

The Orenburgskiy Sovnarkhoz is delaying the expansion of Orskaya TETs No 1. A similar situation exists in Penza. A 50,000 KW turbo-generator has been sitting at the construction site of TETs No 1 since July of last year. It was not installed for a simple reason: the main building is incomplete and no foundation has been built for the heavy machinery.

The list of "debtors" can be continued. However, this is not the point. It is important to ascertain the reasons for this and to show the ways and means of eliminating shortcomings. During the past years the planning organizations of the Ministry of Construction of Electric Power Stations came out with progressive decisions relative to the utilization of prefabricated reinforced concrete components in construction of buildings and structures. Industry began delivering new types of equipment: high and super-high steam parameter boilers and turbines of increased per-unit capacity and output. A commendable fact. But the trouble is that construction agencies of both the ministries and the sovkhozes proved to be totally inadequate in coping with the new problems.

The lack of the necessary powerful and properly equipped bases for the production of bulky units of heavy prefabricated reinforced concrete is one of the factors delaying construction. This first of all applies to the regions of Siberia.

The situation is even worse with regard to industrialization of construction processes in building the power stations where it is in the hands of the construction organizations of sovnarkhozes. To them each power station is subject to individual planning and decisions and the majority of components of structural materials for the production bases of the trusts are not typical but "custom made." They are fabricated at specially-built proving grounds and are often partly hand-made, which increases cost, considerably delays construction, entails waste of metal in production of metal forms, equipment and devies.

Is it possible to change the existing situation? Yes, it is. Planning organizations should strictly adhere to the established procedure, according to which the designers of the structural aspect of a power station with initial capacity of the aggregates of up to 25,000 KW should take into consideration technical conditions approved for the given economic rayon and the rayon catalog of standard building structures and parts.

The Ministry of Construction of Electric Power Stations made the decision to create the rayon production bases. Their construction has already commenced. However, it takes time to organize such enterprises. Meanwhile, prefabricated reinforced concrete is required right now. We believe that it is possible to set up a more efficient system of supplying the required materials, since funds are available. For example, in the regions of construction of large power stations with plant capacities of 50,000 KW and higher (Cheboksarskaya, Kazanskaya, Novo-Kuybyshevskaya, Salavatskaya, Sterlitamakskaya, Orskaya, Novo-Troitskaya and others) the Ministry has large bases. Why not hand the construction of these stations over to the ministry? Organizations of the ministry could bring them to completion with minimum expense. Even in cases where construction of such stations is entrusted to sovnarkhozes, organization of deliveries of standard prefabricated reinforced concrete structures from production bases of the same ministry could be accomplished.

Equipping construction with machinery is another urgent problem. According to the planned specifications a modern power station with turbines of 50,000 KW capacity and higher should have a technological construction and installation system comprising five gantry cranes of 30-ton hoist capacity and a 32 m span each, caterpillar cranes of 10-20 ton capacity and other smaller hoisting equipment. However, unfortunately there is a shortage of such equipment and the sovnarkhoz organizations simply do not have it.

This situation seriously impedes assembly operations. Obviously the question of increasing the production of heavy-duty cranes should be included on the agenda. It should be noted that something is being done in this direction. However, those are only timid steps. More energetic measures are required.

Timely delivery of good quality basic and auxiliary equipment, electro-technical apparatus and cable production are of paramount importance in expediting construction and the production of electric energy at thermo-electric power stations.

Unfortunately, a number of enterprises (Bel'gorod, Podol'sk and Taganrog plants) are not complying with the schedules for delivery of equipment and -- what is particularly regretable -- the equipment delivered is of low quality. Engineers and mechanics are required to try and iron out the defects in conditions at the construction site which incurs a lot of work and expense. Correction of the factory defects in Assembly No 9 of Yuzhno-Ural'skaya GRES cost approximately 18,000 man/days or about a quarter of the total

labor outlay required to assemble the equipment of the entire installation.

The rapidly growing needs for electric power call for a resolute decision to construct powerful thermo-electric power stations with the installation of large units with high steam parameters. Such a course is being taken.

Sovnarkhozes and ministries of communal economy and agriculture must devote more attention to the construction of electric networks and apply more extensively simplified plans and designs of sub-stations, complete sub-stations and complete distribution installations.

Successful solution of this problem will permit us to embark upon the general construction of large thermo-electric power stations.

The RSFSR has at its disposal the means for increasing the capacity of the equipment operating at existing electric power stations, through reconstruction. Thus, the capacity and efficiency of a number of steam turbines can be increased by modification of the chambers between inlet and outlet valves through which the steam passes, replacement of existing rotors by new ones, etc.

Such modifications were carried out on 22 turbines of 50,000 and 100,000 KW capacity at RSFSR electric power stations. This resulted in a general increase of capacity of 220,000 KW, at a cost of 10-12 rubles per each additional kilowatt so obtained. This fruitful experiment will be repeated this year. Modification of the turbine steam chambers is proposed for 14 turbines with an expected increase in their total capacity of 85,000 KW.

There are 40 analogous turbines in operation in the RSFSR. Their modification will yield an additional 200,000 KW.

Generators equipped with hydrogen cooling systems and coupled with steam turbines can carry an additional 10% load as a result of raising the pressure of the hydrogen coolant from 0.05 to 0.9 atmospheres and with minor adjustments of the generator. Consequently, such a measure would increase the output of the operating turbines by 500,000 KW.

The Soviet people are making preparations to greet the 22nd Party Congress. It is the duty of the builders and mechanics of thermo-electric power stations and of collectives of the enterprises furnishing the equipment to do all they can in order to insure fulfillment of the plans calling for putting into operation new electric power potential during the third year of the Seven Year Plan.

THE RATE OF DEVELOPMENT AND ORGANIZATION OF THE POWER ECONOMY -- By A. Stepankov, Moscow, Voprosy Ekonomiki, No 5, May 1961, pp 19-26

The tremendous growth in consumption of electric power as against the general growth of industry is a result of an increase in the usage of electric energy in industrial production, intensive electrification of production processes, growth of electrification of labor, application of electric power in agriculture, electrification of transport, the communal economy and the needs of the population.

The great rate of electric power production compared with the gross increase in industrial production was especially high during the period of implementation of the GOELRO Plan. (According to that plan the rate of overtaking was to be 125% higher than that of industrial production, but the actual rate was 137% higher than that of industrial production.) This progress has slowed down since then. During the second Five Year Plan electric power production was only 21% higher than industrial production as a whole, during the fourth Five Year Plan -- only 12%, fifth -- 1%, while the 1959-65 Seven Year Plan is supposed to show a 20% increase in production of electric power as against the growth index of general industrial production.

This decrease in the rate of growth of production of electrical energy in comparison with the rate of growth of industrial production in its entirety contradicts the tendencies of the development of modern industry. The example of industrial development of the countries of Western Europe and the United States confirms the imperative necessity for a greater differential in the rates of growth of power engineering versus industry as a whole. During the past ten years the increase of electric power production in the Unites States exceeded the increase of industrial production as a whole by 64%, while in Western Europe -- by 80%. Although the USSR showed higher annual increases in the rate of electric power production (1954-59 average -- 11.9% p.a., as against the United States average of 7.5% p.a.), they only slightly exceed the rate of increase of industrial production.

The USSR is approaching, or has overtaken, the United States in production capacity in a number of areas of industry. By 1959 the Soviet Union exceeded the United States in coal mining by 12%, in ore mining -- by 58%, in logging by 2.4%, in sugar production -- by 76%, in production of animal fats -- by 29%, in production of woolen yarn -- by 17.2%, in production of cement -- by 68.4%, whereas in

the production of steel and pig iron the USSR reached approximately 75% of United States production.

However, production of electric power in our country in 1959 was only 31.1% of that in the United States. Also, our country is lagging behind the United States in the output of primary energy resources. The output of petroleum in the USSR comprises only 37% of the level of the United States output; natural gas production is only about 11.4% of that of the United States and in fuels as a whole -- our production is about half that of the United States. Compared with the United States the level of production of electrical energy and the output of fuels (except for coal) are the lowest ones among the branches of heavy industry. In order to catch up the United States (in the shortest possible time) in the output of electric energy, it is necessary to intensify the rate of development of the electric power economy. It must also be noted that apart from the task of catching up with the United States in total capacity of production it is necessary to equal the capitalist countries in per capita production of energy. In 1958 per capita production of electric power was as follows: USSR -- 1,058 KW/HRS, United States -- 4,150 KW/HRS, Canada -- 5,670 KW/HRS, Norway -- 7,700 KW/HRS, Sweden -- 4,100 KW/HRS.

There is almost a direct correlation between the productivity of labor and its electrification. This can be seen from the following comparison of the dynamics of electrification and productivity of labor in USSR (1950 = 100):

	1955	1956	1957	1958	1959
Electrification of labor	146	155	160	169	179
Productivity of labor	144	154	165	174	187

The interdependence becomes obvious also in the fact that, for example, in the ferrous metallurgy, consumption of electric power per worker in the USSR is 44.3% of that in the United States, while annual productinn per worker in the USSR is only 49.1% of that in the United States. The figures are 66.7% and 74.4% respectively in the machine-building industry, 43.2% and 42.1% respectively in the cellulose and paper industry, etc. The level of

electrification of labor in industry in our country is only 35.6% of that in the United States and the lag in productivity of our labor is approximately at the same ratio. Consequently, in order to raise labor productivity (in the shortest possible time) and overtake in this important economic index the United States and other highly developed capitalist countries, it is necessary first of all to effect a corresponding increase in the electrification of labor. However, this is possible only in intensification of the rate of development of electric power so as to insure that insufficiency, or high expenditure of electric power production, in any one economic region, industrial centre, city or village will not limit its availability to industry, agriculture, transport, and communal, cultural and residential needs.

On 28 November 1959, in his speech during the All-union Conference on Power Construction, N. S. Khrushchev pointed out that the long-term plan of electrification of the country for the next 15-20 years and the plan of development of the national economy during the same period should become the mainstay of our program of communist development." In the area of the development of electric energy, the problem is to liquidate first of all the lag in this important branch of production as compared to the level of production in the United States.

The existing prognoses on the development of electric power in the United States are based on the fact that electric energy production is doubled every ten years, which is an equivalent of 7-8% annual increase. Such an increase in the production of electric power took place in the United States and in the majority of Western European countries during the past ten years.

Preliminary plans of the Peyli /Russian transliteration/ Senate Committee envisaged United States electric power production to be 1,400 billion kilowatt-hours in 1975. The Federal Power Commission raised this figure to 1,668 billion kilowatt-hours, while actual production of electric energy in 1959 by all power stations was 795 billion kilowatt-hours. According to the forecast compiled by the magazine Electrical World, the development of electric energy in 1975 should reach 2,423 billion KW/HRS with total capacity of power stations established at 480 million KW. The forecast of the federal commission is no doubt more realistic.

In order for the USSR to catch up with the United States in production capacity of electric power stations and in the development of electric power networks, it is necessary to raise the rate of the development of our electric power engineering. It seems to us that the surplus

created by the overproduction of annual plans as well as the savings derived from construction and operation of electric stations should be extensively utilized.

The Appeal of the participants of the All-union Conference of Power Construction pointed out that "the main task of power constructors is to insure during the current seven years a new mighty boost in the development of electrification in the country and the accomplishment, ahead of schedule, of the power construction tasks set forth by the Seven Year Plan."

According to the 1959-1965 Seven Year Plan the increase in gross industrial production is set at 80%, which is equivalent to an annual rate of increase of 8.6%. Average annual increase of production of electric energy is approximately 14%, i.e. the rise in the production of electric energy surpasses that of general production in industry by 20%. Considering that the 11.9% increase in electric power production during the 1953-59 seven year period did not eliminate the deficit, it is necessary to utilize during the current Seven Year Plan all the reserves and possibilities of expediting the rate of production of electric energy. It must be remembered that the general industrial production requirements set by the Seven Year Plan are being overfulfilled regularly; this causes an increase in the requirements set for the electric power supply of industrial production.

Implementation of Lenin's idea of electrification of the country demands a considerable increase in the volume of construction of high-voltage transmission and distribution networks and elimination of the lag between construction of power networks and the growth of electric power. The complete electrification of the Soviet Union requires tremendous capital investments and great material and financial efforts. It is true, however, that in power construction as well as in many other areas technical progress tends to reduce the capital requirements which aids considerably in the solution of this historical problem. Construction of powerful thermo-electric stations with 150,000, 200,000, 300,000 and 600,000 KW aggregates will reduce by half the specific per kw capital investment of fixed capacity compared with the present level. In view of utilization of the rivers abounding in water and suitable for power installations in the Eastern regions of the USSR as well as ever-increasing efficiency in the organization of construction methods and erection and equipping of hydro-electric power stations, a sharp drop in capital investment in hydro-electric power construction may be

anticipated.

Considerable shortcomings in the development of the electric power economy of the USSR are caused by not observing properly the principles of centralization and concentration of production and the planning of development of electric power stations and networks on the basis of a unified and comprehensively proposed general plan. Although the efficiency of centralization of production of electrical energy is gradually increasing and consisted of 87% in 1959 as against 80.8% in 1950, the attained level of centralization of electric power production should still be considered inadequate.

The electric power economy of our country is extremely scattered: the energy of 75.3% of all power systems comprises less than 500,000 KW each, while about half of them are of less than 200,000 KW each. There are only three large amalgamations of power systems in this country: Tsentral'noye (Central), Yuzhnoye (Southern) and Ural'skoye (Ural). Many systems do not serve the rayon and, in practice, supply power only to the consumers in large cities. It is not uncommon that electric power stations and networks situated on the territory of the same economic rayon and belonging to different agencies are not consolidated.

Since the GOELRO plan we had no unified national economic plans for electrification. Planning of the power economy was scattered among separate branches and departments. The narrow "departmental" approach to power planning was responsible, to a great extent, for its division into "large" and "small" and into the parallel existence of large rayon electric stations and systems serving industrial regions and the less powerful stations and networks in rural areas and small towns. A number of electric power stations of industrial assignment which furnish electric and thermal energy to individual enterprises belong to the "small power" class. As of 1 January 1959 the total number of such electric stations in industry and the communal economy reached 1,480 and their combined power -- 7.3 million KW. More than half of these stations (by power) are not connected with the energy systems and work separately. Average cost of the power produced by them is 2-3 kopecks per KW/HR, whereas the power produced by "large power" stations costs about 0.8 kopecks per KW/HR.

The national economy of our country is inadequately provided with high-power electric power networks and capital invested in their development is insufficient. During the past years only 10-15% of the total capital investments in electrification were directed toward development of electric power networks whereas in the United States and Western Europe approximately 50% of all capital investments

in electrification are earmarked for electric power construction. In 1958 total length of electric power networks in power systems comprised 1.7 km per 1,000 KW of fixed power of electric stations, whereas in the United States (according to information covering 1955) it was 3.7 km. Electric power system networks cover at present approximately 20% of the populated areas of the country. Actually, however, the extent of service furnished to populated areas by the centralized electric power supply does not exceed 10%, since the facilities for hooking up to power systems are not utilized to any substantional extent at all.

The Seven Year Plan provides for a substantial increase in capital investment in the development of high-voltage electric power networks: they will comprise 25% of total capital investment in electrification.

Amalgamation of power systems and individual electric power stations for joint operation on general electric power networks is delayed due to lag in construction of high-voltage networks. There are only three large unified electric energy systems in the USSR, whose capacity is approximately 5-7 million KW each.

In our opinion it is necessary to conduct extensive work on increasing the capacity, the development of electric networks and combining the adjacent power systems before raising the question of practical creation of a single power system for the Soviet Union.

In view of inadequate development of electric power networks and power systems a substantial part of the territory of the Soviet Union is being electrified due to the construction of minor electric power stations. In 1955 the total number of small electric power stations (not including generator trains and other mobile installations) of up to 500 KW was over 105,000, 41,000 of which were rural stations. The number of such low-capacity stations and their share in development of electric energy continues to increase. By 1959 their number (including portable electric power stations) increased to 157,000. Average capacity of the new small stations is only about 100 KW. These stations, with total capacity of about 13 million KW, work under fixed capacity (average -- 1,500 hrs a year) and produce about 20 billion kilowatt-hours per annum. At the same time they use over 20 million tons of conditional fuel. Operating personnel of these stations total 800,000. Specific consumption of conditional fuel averages 1.2 kg per KW/HR and the cost of electric energy is about 10 kopecks per KW/HR.

At the same time 197 thermo-electric stations of the former Ministry of Electric Power Stations, with a

total capacity of 17,800,000 KW, produced in 1955 102.3 billion KW/HRS with personnel totalling 85,000, specific consumption of conditional fuel at 0.48 kg per KW/HR, with utilization of the rated capacity of 5,700 hrs per year and an average cost of 0.9 kopecks per KW/HR. If energy had been produced by the small stations under the same technical and economical conditions, the national economy would have had an annual savings of approximately 1,8 billion rubles.

During the Fifth Five Year Plan 9.6 billion rubles were invested in thermo-electric stations uof up to 500 KW capacity of 27.1% of the total capital invested in thermo-electric stations. Average cost per kilowatt installed at these staions was 4,000 rubles. Total expenditures for the construction of all hydro-electric power stations was about the same as that for the construction of these stations. But in 1959 the former produced 47.6 billion KW/HRS of electric energy (i.e. 150% more than the production of small stations) with an average cost of about two kopecks per KW/HR.

Many electric power stations under the management of the communal economy are inefficient. All electric power stations of the Ministry of Communal Economy RSFSR, with a total capacity of 250,000 KW, produced in 1955 940 million KW/HRS with average consumption of conditional fuel at one kg per KW/HR and cost of electricity at 4.6 kopecks per KW/HR. In a number of small towns where demand for electricity is low, there are several electric stations in operation. In Melekes there are 33, in Kotel'nich -- 22, in L'gov -- 17, etc.

Small electric power stations are often built in the immediate vicinity of high-voltage power transmission lines (Venev and others). Many towns and villages, and individual sovkhozes and kolkhozes in particular, cannot be connected to the large power systems due to the fact that the nearby high-voltage power transmission lines were constructed for the purpose of supplying only large cities and industrial centres and, consequently, have no intermediate step-down sub-stations. For example, the powerful transmission line from the Volga GES imeni Lenin to Moscow does not have a single intermediate sub-station along its entire 1000 km length; it delivers electric power only to the Moscow Economic Rayon. This again is one of the results of bureaucracy. The former Ministry of Electric Power Stations united only the rayon electric stations; it did not bother with the general electrification of the country and had as its purpose the task of supplying the largest industrial centres and cities with electricity and heat.

Only high-voltage power transmission networks

(of 35 KW and higher) were under the charge of the Ministry of Electric Power Stations. Operation of distribution networks was under the charge of individual enterprises and local Soviets in the cities and rural rayons. The majority of distribution networks were in a dilapidated condition due to poor supply of wire, cable and electrical equipment. A large amount of energy was lost in those net-works.

Reorganization of the industry administration and creation of sovnarkhozes opened up possibilities for a drastic improvement in the organization and administration of the country's electric power economy. However, many remnants of departmentalism have not been eliminated. Even in those economic rayons where power administrations were organized within the sovnarkhozes, they took under their management only the power systems of the former Ministry of Electric Power Stations. The rest of the stations of the economic rayon are, as in the past, operated by a multitude of different departments, branches of sovnarkhozes, ministries, oblast organizations, etc. Power systems belonging to the former Ministry of Electric Power Stations preoccupy themselves with only their "own" electric stations and networks and accept no responsibility for the work of "small-scale" power engineering in the territory covered by the given network, while it is difficult for Gosplan to solve the problems of planning and coordinating the "large" and the "small".

Electricity for the sparsely-populated areas distant from the rayon power systems is supplied by small electric power stations out of necessity. However, construction of low-capacity electric power stations -- mostly diesel and of traction engine construction -- for industrial enterprises in the cities and rayon centres located within the zone of power systems cannot be considered normal. Construction of small electric power stations continues in the large cities connected with power systems. In such an industrialized centre as Baku there are 113 small electric power stations of industrial and communal assignment totalling 22,000 KW, operating parallel with the rayon stations. There are 70 small stations in Sverdlovsk with a total capacity of 42,000 KW. In Stalingrad, which was rebuilt after the war, 32 new electric power stations have been constructed with a total capacity of only 45,000 KW.

Specific capital outlay invested in the construction of thermo-electric power stations with plants of 1,000-1,5000 KW represents 300-500 rubles per kw, whereas specific capital investments in a powerful electric power station with aggregates of 100,000 KW each do not exceed 110-

120 rubles per KW. Even taking an unfavorable example of transmission of low output (10,000 KW) through a 110 KW line for a distance of 120 km, the specific capital investment will not exceed 140 rubles per KW of the capacity being transmitted. Normally capital investments in power transmission lines and distribution networks required to effect the connection with the power system networks pay for themselves in less than a year.

According to calculations it is profitable to feed approximately 80% of agricultural consumers (sovkhozes and kolkhozes) from the power system networks and only 20% from isolated electric power stations. Hooking-up communal and industrial consumers located in the cities to the large power systems is even more effective.

In February 1961 the CC of the Party and the USSR Council of Ministers adopted a special resolution "On Electrification of Agriculture in the USSR in 1961-1965." This resolution proposes to accomplish electrification of agriculture mainly by means of connection with existing and newly-constructed electric power networks and also with traction sub-stations of the electrified sectors of the railroads. Construction of rural rayon and inter-rayon diesel electric stations and hydro-electric power stations of increased capacities will be allowed only in rayons remote from the electric power networks. It has also been resolved that it is necessary to increase substantially 1961-1965 capital investments for electrification of agriculture and also to carry out a number of measures on introduction of electric energy into agricultural production as well as improvement in the design, construction and operation of rural electric power stations and installations. Implementation of the outlined measures for improving electrification of agriculture will play an important role in the improvement of organization of the country's electric power economy, in the increase in labor productivity in agriculture and in improving the lot of the rural population.

It seems advisable to create a central body -- a special committee on electrification -- for the purpose of eliminating organizational shortcomings and lack of coordination in the business of electrification in the country, working out a uniform plan of development of the power economy and control over its implementation. Such a committee could undertake to centralize leadership in the introduction of new techniques and automation in the production of power, transmission and distribution of energy, technical and planning management of large inter-rayon power systems, etc. It is also necessary to centralize

technical management and planning of power engineering within each economic rayon on the basis of the formation of a single power administration which would solve all problems of power supply for communal and agricultural consumers.

EXPEDITE ELECTRIFICATION OF VILLAGES -- Tbilisi, Zarya Vostoka, 3 June 1961

What is the status of electrification of villages in Georgia and what goals have been set for the further development of electrification? These questions were discussed at a meeting of the workers of village electrification of the Republic, which took place at the Georgian Agricultural Institute. The meeting was opened by I. Khokhlov, Chairman of the Republic Union "Gruzsel'khoztekhnika" of the Council of Ministers, Georgian SSR. V. Metreveli, Chief of Main Administration of Electrification of Agriculture in Georgia, spoke before the body.

The 21st Party Congress outlined the goal -- to complete basic operations in electrification of kolkhozes and sovkhozes in our country, by the end of the Seven Year Plan. The workers of electrification of agriculture are laboring without respite on implementation of this goal. The electric power stations operating at present have a total capacity of 45,500 KW, 7,000 km of high-voltage power transmission lines and about 12,000 km of low-voltage distribution lines have been installed; also, over 1,900 consumer sub-stations have been constructed. Many kolkhozes and sovkhozes and all maintenance and repair stations as well as other agricultural enterprises have been electrified.

A number of kolkhozes and sovkhozes of the republic utilize electric power in agricultural production as well as in everyday life. As a result of the use of electric energy, the kolkhozes and sovkhozes of the republic saved several million man/days in 1960 alone; people have been saved much labor.

During the current Seven Year Plan the utilization of electric energy will grow considerably, and electrification operations will be expanded. It is intended to install during 1961-1965 8,200 km of rural power transmission lines, 11,000 km of distribution networks and to construct 2,260 consumer sub-stations, etc. The electrification of villages in the Georgian SSR will be accomplished basically by con-

necting the kolkhoz and sovkhoz networks with the state power systems as well as with the traction sub-stations of the electrified railroads. In the regions which are isolated from the state power systems, the electrification of agriculture must be accomplished by constructing new high-capacity rural hydro-electric power stations.

Both the speaker and the participants in the debates pointed out that the plans for rural electrification have remained unfulfilled for years. During the past three years only 325 kolkhozes were electrified, instead of the planned 402. Plans for power mechanization of production methods in the electrified kolkhozes are regularly neglected. Standard specifications are not applied sufficiently in planning and construction.

Upon completion of the report, the following officials took part in the debates: M. Tavdgiridze, Manager of the "Gruzsel'elektrostroy" Trust; O. Kiladze, Manager of the Adzharskoye Power Exploitation Department of the Main Rural Electrification Administration of Georgia; V. Evanbgy, Manager of the Abkhazskoye Power Exploitation Department of the Main Rural Electrification Administration of Georgia, and others.

P. V. Kovanov, Second Secretary of the CC of the CP of Georgia gave a speech during the meeting. The conference adopted a resolution calling for practical measures to be taken with a view toward expediting rural electrification.

POWER ENGINEERING IN THE YEAR 2000 -- Moscow, Stroitel'naya Gazeta, 7 June 1961, page 4.

Soviet scientists are directing their gaze toward the distant future. Looking far ahead into the coming decades they are endeavoring to imagine the roads science will take and the height of accomplishment that the productive forces of our country will reach.

This is the reason why the Energeticheskiy Institute imeni G. M. Krzhizhanovskiy of the AS USSR has launched an extensive research project on the subject of "Soviet Power Engineering in the Year 2000".

Recently the Scientific Council of the institute held an enlarged session (taking part: academicians S. G. Strumilin, A. I. Berg, M. A. Mikheyev, representatives of the Gidroproyekt Institute, Gidroenergoproyekt, Teplo-

energoproyekt and a number of other scientific and research organizations) to hear the first results of this work. The report was made by scientific worker A. B. Markin.

What should be the level of development of our country's power engineering if it were to insure the highest level in the world of production and standard of living which would fulfill all the requirements and aspirations of the members of our society? Answering these questions, the speaker told about the types of new electric power stations which would have to be constructed, about the difference of such stations from existing ones and of the fuel that would be required to operate them and in what quantity, etc. It was also mentioned that the power stations operating in the year 2000 will have a capacity of up to five million kilowatt and will be operating on super-high steam parameters.

In order to transmit such a tremendous amount of electric power to distant points, new power transmission lines will be required. The speaker also mentioned the proposal for creation of the Eurasian "East-West" line, which could transmit electric energy at one hundred million kilowatts.

"By the year 2000,", continued Markin, "the energy output per capita will approach 500,000 kilowatt/hours per year (converted to electrical energy). It should be remembered that in 1920 our entire country produced only 500 million KW/HRS."

CONFERENCE OF POWER CONSTRUCTION MEN -- Moscow, Stroitel'naya Gazeta, 9 June 1961, page 1.

The Minstry of Construction of Electric Power Stations held a conference attended by leaders of the construction industry, enterprises and trusts, planning and scientific research organizations.

Discussions were held in the committees and at the planning session on the fulfillment by the collectives of the socialist obligations relative to the improvement in preparations for the fourth year of the Seven Year Plan.

Many collectives which joined in the competition for a deserving and fitting greeting of the forthcoming 22nd Party Congress are fulfilling their obligations honorably. These include the builders of the Staro-Beshevskaya, Pribaltiyskaya and Pridneprovskaya GRES, and the Bratsk and Votkinskaya GES.

There are other organizations which are fulfilling the plans and accomplishing installation of machinery and equipment according to specifications and blueprints. However, inauguration of new electric power production causes alarm. A particularly unfavorable situation was created at the construction sites of thermo-electric power stations in the Urals and Siberia. One of the reasons for failures here is inaccuracy in deliveries; however, the main reason is poor organization of work and lack of scheduling and specifications.

While discussing the tasks for 1962 the conferees proposed many improvements aimed at ascertainment and utilization of production reserves. The imperative necessity for rapid development and strengthening of the specialized construction organizations and formation of powerful enterprises of the construction base was also outlined.

10,389

-END-