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CHINA'S ELECTRIC POWER INDUSTRY SUPPORTS INDUSTRIAL AND AGRICULTURAL PRODUCTION THROUGH INCREASED PRODUCTION AND ECONOMIZATION

Large-scale Increase in Power Generating Facilities in 1965

The electric power industry in China has recently shown rapid development, and it is meeting the development of industrial production and the demand for rural electrification. The electric power situation during this process is reported as follows by the dispatches of the New China News Agency.

In China in 1965 power generating facilities which surpass the grand total of those in 1963 and 1964 were put into production.

New transmission lines were stretched to main grain- and cotton-producing areas, and the consumption of electric power in these areas was increased by 29% over the preceding year.

At present, in most villages in over half of the 2,126 hsien throughout the nation, electricity is being utilized for irrigation, drainage, processing of agricultural products, and illumination of the houses of rural families, schools, people's commune offices, and clubs.

The consumption of electric power in the rural areas in 1965 had increased by 25 times compared with that in 1957 -- the year preceding the establishment of the people's communes.

China's electric power industry fulfilled in advance the annual target for 1965. Great results were achieved in 1965 regarding safe production and supply of electric power.

At thermo-electric power stations a total of 1.6 tons

of fuel was saved, and in the process of electric power supply, 490 million KWH of electric power were economized.

A dispatch of the Chung-kuo Hsin-wen She (China News Service) dated 2 May 1966 reports as follows on the situation of electric power in the rural areas.

Since the formation of the people's communes in 1958, the electrification of rural areas had seen great progress in broad rural villages of China, especially in the suburbs of cities and the main food and cotton production centers. At present the capacity of electric motors for farmland irrigation has increased 45 times compared with that in 1957, and the consumption of electric power in the rural areas has increased 34 times. Electricity has been spread to over 1,300 hsien throughout the nation. The progress made in rural electrification in the Pearl River Delta, the Yangtze River Delta, the North China Plain, the Sung-liao Plain, the Kuan-chung Plain, and the middle and lower reaches of the Yangtze and Yellow Rivers is of considerable scale. In such national minority areas as Kwangsi, Inner Mongolia, and Sinkiang the use of electric power in rural areas is making constant progress. In the Tibet Autonomous Region situated in the Southeastern Plateau of China, over 30 medium and small power generating stations have been constructed in the past several years. In remote mountainous areas where no electricity was used, electric lights now glitter like so many stars.

Construction of Power Stations in Several Places

The construction of power stations of late is as follows: The Number 2 generator (75,800 KW) at the Che-hsi Hydroelectric Power Station began its generation in 1965, and the Number 3 generator is ready to be installed. Similarly, the Number 3 generator at the Hsi-ta-yang Hydroelectric Power Station (9,000 KW) in Hopei Province started its generation on 10 January 1965. The installation of the Number 5 generator (72,500 KW) at the Hsin-an-chiang Hydroelectric Power Station (650,000 KW) was completed, and its Number 6 generator is being presently installed. The Number 1 generator (generating power unknown) at Nan-ch'ung-ch'ingchu -- the first generating station on the Chia-ling River in Szechwan Province -- has begun operation. The following is news pertaining to small power stations in various places.

Kwangtung Province -- In T'ai-shan Hsien, construction of the Overseas Chinese Hydroelectric Power Station (invested in by overseas Chinese) at Ta-lung-tung (over 2,000 KW) was completed. Over 70 km of high-voltage transmission lines were installed, and formal operation began on 18 November 1965. (China News Service, 28 November 1965.)

In Ta-pu Hsien, the Pai-hou Hydroelectric Power Station

(2,080 KW) is under construction. Four sets of generator units will be installed here.

In the rural areas of the Li and Miao Autonomous Chou in Hainan over fifty small hydroelectric power stations (including hydraulic turbines capable of generation) have begun operation. In the same autonomous chou are 23 hydroelectric power stations and a group of hydraulic turbine pumping stations capable of power generation. (New China News Agency, 3 July 1966.)

Fukien Province -- The western part of the province has water resources amounting to five million KW. At present there are over 80 small power stations scattered throughout villages in the hills. These power facilities total 30 times more than those of the Liberation period, and their generating capacities are more than 50 times as great. The length of their transmission lines is 3,400 Km. In 1965 plans to construct over 70 power plants with over 1,500 KW capacity were formulated. Already the construction of 26 plants with almost 700 KW total capacity has been undertaken. (China News Service, 11 October 1965.)

In Yu-hsi Hsien the construction of 63 small power plants with a total capacity of 1,800 KW has been completed, and 17 additional power plants are under construction. (NCNA, 2 July 1966.)

Kwangsi Chuang Autonomous Chow -- Here power generation for 18 days is equivalent to that for one year before the Liberation. The capacity of power plants has been increased over 20 times compared with the early post-Liberation period. In addition to large and medium power plants, a group of small hydroelectric power stations have been constructed. (CNS, 10 October 1965.)

In the Ta-miao and Shan-miao Autonomous Hsien many people's communes constructed a group of small hydroelectric power stations in 1965. (CNS, 1 February 1966.)

Yunnan Province -- There was only a small power plant of 240 KW capacity in Ta-li Hsien before the Liberation, but now a hydroelectric power plant has been constructed at Hsi-erh-hai. Thus the supply of electric power has been greatly improved. (Chung-kuo Hsin-wen [China News], 5 February 1966.)

In the Hsi-shuang-pan-na Thai Autonomous Chou seven small-scale power stations have now been completed and there are eight others now in construction.

In the Thai farming villages in Lu-hsi Hsien of the Te-hung Thai Chingpo Autonomous Chou are found 23 small hydroelectric power plants, and 4,000 farming families are using electric power.

The Sinkiang Uighur Autonomous Region -- In this autonomous region over 300 medium and small power plants have been completed. Thus the electric generation capacity has been increased by six times compared to that in 1955. Before the

Liberation there were only small power plants at Urumchi, Ining, and Tahcheng. But considerably large power plants have already been constructed at over ten cities including Urumchi, K'u-la-ma-i, Shih-ho-tse, Kashgar, and in the factory and mining districts. Moreover, small thermo-electric and hydroelectric power plants are under construction in scores of hsien scattered both north and south of the Tien-shan Mountains, at over 100 State-operated farms, livestock farms, and at some people's communes. (NCNA, 22 September 1965.)

Tibet -- There are over 40 medium and small power plants. In the latter half of 1965, six small hydroelectric power stations were completed, and the plans call for the construction of 12 power plants. The generating power of each of these ranges usually from 10 KW to several tens of KW, and they are under construction through the investment by the sectors related to the Central Government.

Tsinghai Province -- The largest and 27th hydroelectric power station of the province was completed and began operation in the latter part of March 1965 (400 KW); it is situated along the Huang-shui River. (NCNA, 2 April 1965.)

The Capacities of the Completed Large Power Plants

Through these news reports we can judge that numerous small power plants have been constructed in the rural areas throughout the nation. As to large power plants, the Number 2 generator (57,500 KW) at the Hsi-chin Power Plant seems to have begun operation. And it is about time for the 44,000 KW generator to be used at the Yen-kuo-hsia Power Plant (400,000 KW) on the Yellow River to begin operation. In 1965, hydroelectric power generating facilities amounting to over 100,000 KW were completed in Harbin, and because hydroelectric generating facilities are naturally combined with the designing of dams, it is consequently imagined that a large power station has been completed on the Yellow River system in order to install these facilities.

As to thermal power generation, China has succeeded in the trial manufacture of a 100,000 KW double internal water-cooled steam turbine generator. It is reported that this Chinese-developed generator, which directly cools the stator and rotor with water, can boost generation capacity to twice as much as the air-cooled type. And because the 50,000 KW generator unit has now been mass produced for several years, there should be no technical problems in mass producing 50,000 and 100,000 KW generators.

As to power transmission, transformers as large as 120,000 KVA and 220,000 volts have been manufactured at Mukden. Large transformers with capacities of 240,000 KVA have recently been manufactured. The advanced air-filled

type 220,000 KVA high-voltage circuit breaker is being produced at the Mukden High-Voltage Switch Plant. They have also succeeded in the trial manufacture of the 12-ton class high intensity suspension type insulator that can be used for 330,000-volt super high-voltage transmission lines. As to electrical condensors, the new type of condensor using trichlorobenzene as insulation infusion material has come into being. Even though actual figures for recent years have not been published at all, we would not be surprised to find that the capacity of the new power generating facilities surpasses that of the total of 1963 and 1964.

Rationalization of the Management of Modern Large Power Plants

On one hand, technology has been improved in the generating, transmitting, and distributing sectors of China's power industry, and management has been rationalized. On the positive side, the latent potentials of facilities have been dug up, and a great amount of electric power is being produced. For instance, at the conference of the directors of the hydroelectric sector of the nation in 1965, it was recommended that the experience in the reform of enterprise management carried out at the Peking Thermoelectric Plant -- which is one of the main power plants in the Peking-Tangshan-Kalgan electrical power network -- be disseminated to modern large power plants throughout the nation. Its contents consisted of: (1) Administrative structures were simplified; the nine sections of the entire power plant were reorganized into five control teams; control was concentrated in the higher section, and service was carried out by the service sub-teams. (2) Branches were abolished, and the production of the entire power plant was organized into the two large systems of "power generation operation" and "facilities maintenance." Under the unified guidance of the chief and assistant engineers, specialized fuel, boiler, and generator technicians were assigned. Thus the specialized control of facilities and operation was strengthened, allowing for the solution of important problems and insuring safe and economical operation. (3) The ranks of repqir workers were concentrated, and by consolidating more than 400 inspector-repair personnel, repair team under the guidance of a higher firm was organized. This repair team was assigned repair work not only for this power plant but also for five other power plants in the electric power network, thus saving manpower at the other power plants. (4) The range of responsibility of each engineering workshop was re-defined. Thus the limits of too detailed division of work were broken up and the method of letting one section taking care of other sections was adopted. (5) After the

reform of the organizational structure, the regulation system concerning finance and material supply was correspondingly improved, and the delivery of materials to work sites was carried out.

Through the foregoing reforms, the total number of workers at the power plant was decreased from 1,500 to 760. Even if the repair team was included, the total number was decreased by one-third. Yet breakdowns were repaired in less time than before, and interruptions and accidents were decreased. And the time needed for boiler ignition, the starting of the generator, and for increased transmission and connection was shortened.

The Foreign-type System was Fully Reformed

To elaborate this, the Peking Thermoelectric Plant began its operation in 1959. At that time there were comparatively few such large thermoelectric power plants throughout the country. Thus the workers lacked management experience and they had to borrow the enterprise management methods of a certain foreign country. These management methods played a certain role in safe operation. But many irrationalities were found in practice. Electric power generation is extremely complicated, and the relationship among the fuel, boiler, generator, thermal control meter, electricity, and chemical processing sectors is extremely close. The past management methods did not start from the characteristics of production, but instead from the emphasis on "specialized control." Thus one unified production process was divided into six workshops, and each workshop was equipped with a certain level of personnel and facilities. Moreover, too many sections were established in one part of the power plant, which resulted in mutual restraint. Thus the regulating system was unfavorable to production. Consequently, the organizational structure as well as personnel organization became huge. Moreover, the division of work among sectors was too detailed. The system was too complicated, and mutual accomodation was bad. This resulted in many obstacles and problems not being solved in time, and many persons being engaged in wasteful labor. Because this power plant is a component part of the Peking-Tientsin-Tangshan-Ralgan electric power network, certain specialized work of the plant had to be controlled uniformly by the control structure of the electric power network -- the Peking Electric Power Company. But the power plant was operated as a completely independent production unit, and each specialized sector had its own organization. Therefore, large amounts of manpower and materials were wasted.

The Old Generating Facilities were Revived by Technical Reform

At old power plants technical reform has been carried out to remodel old facilities and to improve the generating capacity and efficiency. The Liao-yuan Power Plant in Kirin Province, which was established in 1921, remodeled their old 1930 facilities into comparatively better facilities among the power plants of a similar category, and it thus became an advanced power plant. It is now lauded as the "Ta-ch'ing of the electric power sector." At this plant 700-800 grams of coal were used for each KWH. But in the last decade, the workers at the same power plant carried out over 200 comparatively large technical reforms. The capacity of the old facilities surpassed the level of design, and the facilities were brought up to the most advanced level among power plants of a similar type throughout the nation. The amount of coal consumption dropped to the lowest among plants of a similar type throughout the nation. The amount of coal saved at the power plant during the past 16 years has totaled almost 1 million tons. The coal unloading, coal transportation, coal ash elimination operations of the power plant have almost been completely mechanized.

One boiler at the Hsia-kuan Power Plant in Nanking had some defects and did not fully exert its capacity, thus adversely affecting the plant's power generating capacity. The plant remodeled this boiler in the latter half of 1964, and added appropriate supplementary machine facilities in order to combine the generating power of the main and supplementary machines. Consequently, the power generating capacity of this plant was increased in 1965 by 10,000 over 1964.

The rated output of the Number 1 generator at the Soochow Power Plant is 3,600 KW. But when the temperature of river water rose in summer, cooling became a problem and output dropped to 3,000 KW. This year the workers at the plant overcame the difficulty of material shortage and added a condenser to the generator in order to expand the cooling area, thus allowing the generator to finally produce its rated output.

490 Million KWH was Saved in the Power Distribution Sector in 1965

In the power generation and distribution sectors of Shanghai Municipality, electric power was utilized by such methods as load adjustment, and the consumption of electric power at the plant was economized. At the same time, transmission losses in various fields were reduced. The total

amount of electric power used at the plant and the total amount of power saved through the elimination of transmission losses by the electric power system in Shanghai during the period from January-September in 1965 was over 28 million KWH.

In the electric power sector in Kiangsu Province the consumption of electric power at the main plants in such cities as Nanking, Chin-chiang, Shang-chou, Wusih, and Soochow was clearly defined. By adjusting operation, service, and the hours of electric power use, a large amount of electric power was turned over to rural areas. The problem of limited transmission capacity due to irregularity in the specifications of leading wires in certain sections of the high-voltage transmission lines was solved. Larger amounts of electric power were poured into transmission lines in excess of the safety coefficient established by the "regulations" of a certain foreign country, and the transferring of part of Shanghai's electric power to rural areas was successfully carried out.

The workers in the electric power sector in Manchuria have achieved safe electrical supply, strengthened line maintenance and safe operational control of the electric power network, contributing to the economization of electricity. As a result of the strengthening of line maintenance in 1965, transmission loss was reduced by 0.36% over the preceding year. This alone saved 27.66 million KWH.

Each power plant in Shantung Province strove to economize electricity. At the Huang-tai Thermal Power Plant it was discovered that the consumption of electric power by the small facilities at the plant for one month amounted to over 500,000 KWH. Thereupon in 1965 these small facilities were reorganized, classified, and measures were taken to reduce the consumption of electric power for miscellaneous uses. Consequently, over 3.89 million KHW were saved during the period from January to September.

Electric power saved in the process of supplying power during 1965 throughout the country amounted to 490 million KWH.

While Thermal Efficiency was Increased Coal Consumption was Reduced

As was mentioned earlier, the thermal power plants throughout the nation saved a gross total of 1.6 million tons of fuel during 1965. The coal consumption for power generation during 1965 was reduced by 2% compared with 1967. The thermal efficiency of boilers has approached or reached international advanced levels.

In this year also production at power plants across the country has been better than ever before, and the consumption of coal and electric power at plants has been drastically reduced. If we combine these together, it is estimated that over 300,000 tons of coal were saved during the period from January to May 1966. In addition, various power plants used inferior coal to save over one million tons of good quality coal for the country, turning it over to steel and chemical fertilizer industries. This year the workers at many power plants challenged various obsolete rules and conservative modes of thinking which hindered increased production and economization, and at the same time they adopted practical organizations and technical measures.

At the Fu-hsin Power Plant, generated power reached only 90% of full capacity because there were problems in the manufacturing and designing of three sets of imported machines. Some workers thought it would be extremely difficult to improve the power generating capability of the facilities beyond the present level. But during this year's movement for increased production and economization the workers corrected their wrong thinking, consolidated their basic training for operation, examined rules in detail, and found key points. They repeated their research, made bolt tests, adopted several effective measures, took out two useless valves from each set of machinery, raised steam pressure and steam temperature to the specifications, and raised the generating power of the facilities to the designed capacity. Through only this one reform, more than 10,000 tons of coal were saved for the year. Coupled with other measures, the coal consumption at the Fu-hsin Power Plant during the first quarter of 1966 was reduced to 381 grams per KWH, which is a new record.

At the Yang-shu-p'u Power Plant in Shanghai many workers used to be bound by foreign ways and old habits. They figured that they had to supply water with three sets of feed pumps to the high-voltage boiler, otherwise it would affect safe operation. But this year the workers boldly proposed to remove one set of feed pumps, and carried out repeated tests with the support of the factory leadership. As a result, it was proved that two sets of pumps would completely satisfy the high-voltage boiler. This measure resulted in the economization of facilities as well as the economization of over 10,000 KWH per day.

This year the workers at the Huai-nan Power Plant destroyed bourgeois "authorities," obsolete rules, and old systems to attain great production. The power generation during June was increased by 7.5% over the average during the period from January to May, and by 6% over the corresponding period of 1965; that during July was increased by 8.2%. In August, power generation was increased by 2.18 million KWH, and during

this month the highest record of power generation per day was achieved. At the same time the power consumed at the plant was markedly reduced compared with that during the corresponding period of 1965. The coal consumption rate at the plant reached the advanced level stipulated by the State, and the cost of power generation was drastically reduced. At the same time, the same plant is executing the plan for safe power generation.

The Electrification Method that Economizes Several Hundred Million KWH

Not long ago the Ministry of Water Conservancy and Hydroelectric Power held a national on-the-spot model operation conference on electrification work at Anshan Municipality in Liaoning Province. At this conference the great results of electrification work which had been well disseminated during the past year were fully examined, and experiences pertaining to this were exchanged.

Electrification work methods call for carrying out inspection and repair of high-voltage lines and facilities. If this were to be practiced throughout the country, at least several hundred million additional KWH of electric power could be supplied, and with this much power over ten million tons of chemical fertilizers or steel could be produced.

Electrification work was initiated in foreign countries in the 1930's, but only a few nations have adopted it. In China it was first tested and studied in Manchuria in 1953. In 1957 a series of insulating equipment for electrification of power transmission lines was made. In 1958 the workers of the Anshan Electric Bureau succeeded in testing them on lines of comparatively low voltage. Thereafter the Technical Improvement Bureau of the Northeast Electric Power Management Bureau succeed in testing the equipotential method of power transmission on super high-voltage lines. At present electrification work has been spread to 27 provinces, municipalities, and regions throughout the nation. The number of types of work covered by this has been increased from ten to 160, and the range of voltage is from 10,000 V, 35,000 V, 110,000 V, and 220,000 V. Electrification work can be carried out anywhere, including plateaus, rivers, mountains, the extremely hot south, and the extremely cold north. The tools for electrification work are small and light-weight, and can be tied together so that they can be carried in a knapsack. Many aspects of electrification work have reached the world's most advanced level or surpassed it. Some of them are not known in other countries.

Electrification work is greatly advanced in China, but the Chinese are further expanding types and range of electrification. In some areas electrification work is added to the

regular inspection and repair methods. If this is carried out, there will be no interruption of current and the needs of industrial and agricultural production will be filled. Some units, after having executed electrification work throughout the entire electric supply system, are making studies to change the partially electrified work in the transformation and distribution systems to entirely electrified work. Electrification work is also being studied for the power generating system. If tests are successful, it would have a great impact on the socialist construction of China.

China entered her Third Five-Year Plan this year, and she is promoting socialist construction amid the great proletarian cultural revolution. The National Holiday is close at hand, and many reports of increased production at many plants are coming in, which gives rise to a very bright outlook. The electric power industry which supports this industrial production will be assigned a greater duty in the future, but this year it will show a development surpassing that of 1965.

Photo Captions:

1. At the Hsin-an-chiang Hydroelectric Power Plant (650,000 KW), which was designed and constructed for the first time by China alone, generators 1-4 (72,500 KW each) began operation in 1964. Thus the consumption of electric power in the rural areas of Chekiang Province was increased over 100 times compared with 1957. (CIA 1154542)

2. This is a demonstration of electrification work by the workers of the electric power management sector at the Hsin-an-chiang Hydroelectric Power Plant in Chekiang Province in east China. Electrification work which does not interrupt current and enables the inspection and repair of transmission lines is helpful to the support of industrial and agricultural production, and it saves a large amount of State funds. (CIA 1154543)

3. The Number 2 generator (75,800 KW) at the Che-hsi Hydroelectric Power Plant in Hunan Province began generating in 1965. This plant was designed, constructed, and equipped by Chinese capability alone. Its total output is over 400,000 KW, and it transmits electricity to neighboring industrial regions and rural areas in the Tung-t'ing Lake area. (CIA 1065350)

4. Panoramic view of the Che-hsi Hydroelectric Power Plant in Hunan Province. Its construction was begun in July 1958. Power generation capacity of its facilities is 435,000 KW,

and its annual average generation reaches 2.35 billion KWH. As of the summer of 1965, Numbers 1 and 2 generators were in operation. (CIA 1054544)

5. In the suburbs of Shanghai Municipality transmission lines are being rapidly expanded, and the area of electric irrigation is being markedly increased. The photo shows workers of the Shanghai Electrical Supply Bureau working on super high-voltage transmission lines. (CIA 1054545)

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