

UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



LIMITED

ST/ECLA/CONF.7/L.1.05
30 November 1960

ENGLISH
ORIGINAL: SPANISH

LATIN AMERICAN ELECTRIC POWER SEMINAR, *Mexico, Aug. 1961*
//

Held under the joint auspices of the Economic Commission for Latin America, the Bureau of Technical Assistance Operations and the Resources and Transport Economics Branch of the United Nations, with the collaboration of the Government of the United Mexican States

Mexico City, 31 July to 12 August 1961

THE CASE OF CHILE

by Raúl Saez

NOTE: This text is subject to editorial revision.

Chile, like all the other Latin American countries, has been facing a serious power problem for many years. Evidence of this problem may be found in the coal crisis of the twenties and the lack of sufficient electricity, which became noticeable in 1936, increased during the Second World War and reached its peak during the years 1946 to 1948.

To-day the shortage of installed power amounts to about 15 per cent. At present the country is entering a severe overproduction coal crisis.

The reason for this power problem is essentially a failure to understand it and therefore an absence of policy on such an important matter.

Twenty years ago (1940) the electric supply picture was as follows:

	<u>Kilowatts</u>	<u>Percentage</u>
Self-producers	285,200	61
Public service by C.C.E. ^{1/} in the provinces of Santiago, Valparaíso and Aconcagua	136,000	29.4
Public service in the rest of the country	45,000	9.6
Total	<u>466,200</u>	

These figures show that there was: (a) an overall short supply (92 watts per capita); (b) rationing in the chief provinces; (c) absence of industrial power in the rest of the country; (d) lack of service in a great many communities.

At that time the Government decided to approach the problem directly, considering: (a) that the lack of electric power would impede the development of the country; (b) that the Chilean private companies were not in a position to bridge the gap; (c) that prevailing political conditions did not allow the foreign public utility companies to extend their field of action; (d) that only the State was in a position to harness the hydro-electric resources with due regard to the multiple uses of the water.

As a result of State action the situation was as follows in 1958:

	<u>Kilowatts</u>	<u>Percentage</u>
Self-producers	483,000	47.7

^{1/} Compañía Chilena de Electricidad.

	<u>Kilowatts</u>	<u>Percentage</u>
Public service by C.C.E. in the provinces of Santiago Valparaiso and Aconcagua	173,000	17.1
Public service in the rest of the country	23,000	2.2
ENDESA (State organization covering the whole country)	334,000	33.0
Total	1,013,000	100.0

In the coming years the following power values will be added by the self-producers as well as by the private utilities and ENDESA:

	<u>Kilowatts</u>
1959	82,500
1960	93,000
1961	68,000
1962	90,000
	<u>333,500</u>

Investments by the State owned company ENDESA up to 1959 amounted to some 200 million dollars, about 25 per cent of which was financed by international organizations and manufacturers (pesos and foreign currencies being converted to their purchasing power in 1958)

ENDESA is a corporation whose principal shareholder is the Development Corporation (CORFO) (over 95 per cent). Its staff of about 6,000 is entirely Chilean, and they plan, construct and operate their own facilities. Two subsidiaries and 13 rural co-operatives have been set up to help in the distribution of electricity in certain areas of the country.

The development of the electricity supply has proceeded in accordance with a national plan that has taken the available resources especially into account. Basically, the abundant water resources have been developed; these are almost nil in the Northern arid zone, gradually increase towards the South, and are very plentiful in the Central-Southern zone and extremely abundant in the Southern zone. The rivers in the North and North-Central zone depend on the thaw rate, and the winter resources grow

as one advances South. Lastly, in the South-Central zone there is great natural regulating capacity. The average power that it is considered feasible to instal is as much as 20 million kW, which, if properly interconnected, could provide not just an average but a far greater hydrological safety factor.

Apart from its hydroelectric resources, Chile has underwater reserves of bituminous coal (a potential of 160 million tons) that are difficult to work, and about 30,000 million tons of soft coal in the Southern zone, far from the big centres of consumption.

The only oilfields known up to the present are in the Magellanes area and constitute proven reserves of 15 million cubic metres; the possibilities are far greater. There is also natural gas in the same zone but there are no possibilities of putting it to immediate use.

Electricity development on a nationwide scale has come up against a great many difficulties which may be classified as general, economic, financial and technical problems affecting planning, construction and operation, not to mention human problems.

The following general problems are worth mentioning:

- (a) Lack of public awareness of the electricity problem, its importance, its permanency, its sudden growth etc. The solution is a long process of public information.
- (b) Difficulties with the established public utilities, national as well as foreign. Solution: recognize suitable private enterprises as elements that can be used as power distribution channels, coordinate the expansion programmes with them and incorporate them in the national programme. Give their capital fair treatment.
- (c) Inadequate legislation that does not recognize the necessity of compensating for the true value of the capital invested. Because of heavy inflation this problem is particularly serious in Chile. Solution: amend the legislation, which Chile did in 1959.
- (d) Interference from political and local vested interests. This problem is peculiar to any State enterprise. The solution is

/to carry

to carry out the operations according to economically and technically well studied plans, so as to justify and support the programmes under way. In Chile there have been no serious problems of this sort.

- (e) Absence of a power policy for the rational allotment of an area of service to every power source. The solution is to procure the formulation of a policy under which every source of power would be assigned the type of consumption that it can best serve, from the viewpoint of the customer and of the country.
- (f) Lack of proper appreciation of the economic value of electricity. This problem is principally connected with (a) and (e).

The problems which are more properly economic are the following:

- (a) Lack of background data necessary for projecting consumption. This problem arises from the lack of historical data in areas which have had no or only very poor electric service. In general, the methods used to solve this problem have been the comparison between these, and similar areas which are more advanced; correlation with other data such as urban and rural population; economic activity, etc.; economic forecasting and plans for the development of local activities; consumption of other local sources of power; and the rate policy that will be applied.
- (b) Economic criteria that have to be defined for choosing between alternative solutions from the point of view of capital, cost of operation, the foreign exchange component, reliability of service etc. The best solution for this type of problem is the national and international exchange of information and experience.
- (c) The role played by national and foreign private enterprises in the developments; according to our policy this should be as large as possible.
- (d) The rate policy.

The financing problems are many. They arise from the magnitude of the problem, which in the case of areas with a low level of economic development is made worse by the very high growth rate of the total

/population, because

population, because there is a steady increase in the area served and because of a highly elastic demand for electric power. The problem of financing electric power arises from three limiting factors: lack of domestic capital which is not very interested in a business which is not only controlled but also limited as regards its returns; low returns for the enterprises themselves owing to the inadequate legislation already mentioned in regard to rates; insufficient external credit available for dealing with these problems.

The solution of this problem lies mainly in securing appropriate legislation on rates, and making a careful survey of such important factors such as seasonal power, hourly rates, geographical regions in an interconnected system, the nature of consumption, etc.

The technical problems which have been uncovered in the case of Chile are typical of countries at the same stage of development. Some of them are: lack of maps; lack of geological surveys of a general type; lack of reliable hydrometeorological data covering a sufficient number of years of observation; shortage of research staff and equipment; lack of domestic building enterprises with experience in some highly specialized problems relating to electric and plant works; lack of certain suitable materials; lack of general facilities such as roads, schools, hospitals; shortage of operational means of communication; shortage of specialized operational personnel.

As regards many of the above problems, one of the most serious stumbling blocks in any nationwide electric power plan is the human element. ENDESA has solved its problem entirely with Chilean personnel, basically because of the fact that, from the very outset, the necessity for training this personnel was recognized and special care was taken in that connexion.

