

ORIGINAL

Decision No. 42282

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

In the Matter of the Application of
 PACIFIC GAS AND ELECTRIC COMPANY
 for an order of the Public Utilities
 Commission of the State of California
 issuing to applicant a certificate
 of public convenience and necessity
 for the construction and installation
 of the within described steam electric
 generating plants, or units, together
 with the related electric transmission
 lines and facilities.

Application No. 29522

O P I N I O N

In this proceeding Pacific Gas and Electric Company^{1/} makes application for all necessary permission and authority to construct, operate and maintain 700,000 kw of new fuel-electric generating capacity. A public hearing was held before Commissioner Huls.

Pacific's present fuel plant capacity is 696,000 kw. Two units now nearing completion will add 200,000 kw. By August of 1951, the planned additions will increase Pacific's fuel plant capacity by 128% over that available for the 1948 summer peak load. Pacific estimates the cost of the units proposed herein at \$126,595,000 including necessary line connections to the existing transmission system.

Proposed Plants

a) Kern Steam Plant.

It is proposed to add a second unit to this plant comprising a 100,000 kw, 1,800 r.p.m. turbine and a 115,000 kva hydrogen-cooled generator; two 450,000 lb. per hour, 1,550 lb. per square inch, 940° F boilers; one 7,500 kw house turbo generator; a 47,500 square foot main condenser; a 4,000 square foot house-unit condenser;

^{1/} Hereinafter referred to as Pacific.

three single phase 40,000 kva (forced air and oil cooled) 13.2/72.5/120 kv transformers; two 80,000-barrel oil storage tanks; additional water cooling towers and circulating equipment; and two new 110 kv transmission circuits to Midway Substation.

b) Moss Landing Steam Plant.

Three 100,000 kw units will be installed at a new generating plant site on Monterey Bay adjacent to Elkhorn Slough near Moss Landing. The initial installation will consist of three 100,000 kw, 3,600 r.p.m., 13.8 kv hydrogen-cooled turbo generator units; three 7,500 kw house units; six 475,000 lb. per hour, 1,380 lb. per square inch, 950° F boilers suitable for gas, oil, or coal firing; three 50,000 square foot main condensers; three 4,000 square foot house-unit condensers; a cooling water system to take sea water from Moss Landing Bay and discharge it into Elkhorn Slough; oil storage tanks with 480,000 barrel capacity; three banks of single phase transformers with an aggregate forced air-cooled rating of 412,500 kva, 13.8/110/220 kv; a double circuit 110 kv transmission line ten miles to Salinas; a double circuit 110 kv line ten miles to Lagunitas; a double circuit 230 kv line 70 miles to Panoche; and a single 230 kv circuit 26 miles to Morgan Hill.

c) Antioch Steam Plant.

The remaining three 100,000 kw units are to be installed at a new site on the left bank of the San Joaquin River about one-half mile west of the Antioch highway bridge. The plant units are to be the same as those described for the Moss Landing Plant. Proposed new lines to connect the plant to the transmission network include a double circuit 230 kv line 26 miles to Tesla Substation, a double circuit 230 kv line 26 miles to Moraga Substation, a single 230 kv circuit from Moraga Substation 24 miles to Mission Pass, a double circuit 230 kv line from Mission Pass to Newark, and a double circuit 230 kv line from the steam plant two miles to Contra Costa Substation.

Capital Costs

Increases to production and transmission capital which will result from the proposed new plants and lines are estimated at the present time at almost 127 million dollars. The following tabulation shows a segregation of this sum to the principal categories of equipment. Estimates for the Moss Landing and Antioch Plants are necessarily preliminary pending completion of detailed designs. The unit costs, upon which the estimates are based, reflect a possible ten per cent increase in price levels and construction of the plants under contract.

ESTIMATED CONSTRUCTION COST
PROPOSED FUEL-ELECTRIC PLANT ADDITIONS

	Kern	Moss Landing	Antioch
Lands, Improvements, Buildings	\$ 255,000	\$ 4,520,000	\$ 4,520,000
Boiler Plant	3,275,000	13,000,000	13,000,000
Turbo Generators	3,500,000	9,900,000	9,900,000
Auxiliary Equipment	3,315,000	13,560,000	13,560,000
Supervision, Construction Plant and Overheads	2,710,000	10,520,000	10,520,000
Total Plant	<u>13,055,000</u>	<u>51,500,000</u>	<u>51,500,000</u>
Transmission	780,000	5,185,000	4,573,000
Total Project	<u>\$13,835,000</u>	<u>\$56,685,000</u>	<u>\$56,073,000</u>
Capacity, kw	100,000	300,000	300,000
Unit Capacity Cost per kw	\$ 138.35	\$ 188.95	\$ 186.91

The lower unit cost of the second Kern unit results from the fact that provision was made in the erection of the initial unit at Kern for certain of the facilities necessary to accommodate the subsequent addition of the second unit. The present estimated cost of the Kern plant, excluding transmission lines, with 175,000 kw of capacity is \$29,700,000 or \$170 per kw.

Loads and Resources

Pacific submitted a detailed estimate of loads and available capacity and energy resources including the proposed new plants. A brief summary of the estimated demands and available capacity for the summer peaks for both an average water year like 1935 and a dry year like 1931 is shown in the following tabulation:

ESTIMATED LOADS AND RESOURCES
SUMMER PEAK
CAPACITY AND DEMAND IN MEGAWATTS

	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>
Average Year (1935)				
<u>Resources</u>				
Hydro	1,022.7	1,202.9	1,202.9	1,202.9
Fuel	896.0	1,096.0	1,596.0	1,596.0
Other	577.5	526.6	525.7	524.8
Total	<u>2,496.2</u>	<u>2,825.5</u>	<u>3,324.6</u>	<u>3,323.7</u>
<u>Estimated Load</u>	2,320.0	2,500.0	2,700.0	2,920.0
<u>Margin</u>	176.2	325.5	624.6	403.7
Dry Year (1931)				
<u>Resources</u>				
Hydro	929.4	1,111.6	1,111.6	1,111.6
Fuel	896.0	1,096.0	1,596.0	1,596.0
Other	532.6	482.7	482.8	482.9
Total	<u>2,358.0</u>	<u>2,690.3</u>	<u>3,190.4</u>	<u>3,190.5</u>
<u>Estimated Load</u>	2,375.0	2,560.0	2,765.0	2,990.0
<u>Margin</u>	-17.0	130.3	425.4	200.5

The margin shown is the amount of capacity available to meet machine outages both scheduled and unscheduled and to provide spinning reserve. The estimates of resources include the entire estimated Shasta Project output^{2/} but exclude any southern California resources. The demand estimates reflect an approximate rate of growth of eight per cent.

A similar estimate of the relationship of energy resources and requirements are shown in the following tabulation. This estimate likewise contains the same assumptions which were incorporated in the estimates of demand and available capacity.

^{2/} Should the estimated output of the Shasta project not be made available, the resources as estimated will be decreased.

ESTIMATED LOADS AND RESOURCES
ANNUAL ENERGY
MILLIONS OF KILOWATT HOURS

	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>
Average Year (1935)				
<u>Resources</u>				
Hydro	6,032.4	6,900.4	6,948.6	6,948.6
Fuel	6,523.3	7,828.9	10,754.4	11,735.5
Other	2,688.8	2,551.3	2,548.9	2,547.0
Total	<u>15,244.5</u>	<u>17,280.6</u>	<u>20,251.9</u>	<u>21,231.1</u>
<u>Estimated Load</u>	12,800.0	13,800.0	14,900.0	16,100.0
<u>Margin</u>	2,444.5	3,480.6	5,351.9	5,131.1
Dry Year (1931)				
<u>Resources</u>				
Hydro	4,386.3	5,090.5	5,123.2	5,123.2
Fuel	6,523.3	7,828.9	10,754.4	11,735.5
Other	1,998.1	1,894.5	1,894.9	1,895.3
Total	<u>12,907.7</u>	<u>14,813.9</u>	<u>17,772.5</u>	<u>18,754.0</u>
<u>Estimated Load</u>	13,300.0	14,355.0	15,495.0	16,765.0
<u>Margin</u>	-392.3	458.9	2,277.5	1,989.0

While the growth rate of eight per cent used in the load estimate is somewhat below the rates recently experienced, it is somewhat higher than rates experienced prior to the war. Statistics contained in Exhibit No. 1 can be used to determine the growth rates of the past few years as follows:

	<u>System Peak Load</u> <u>Megawatts</u>		<u>Energy Generated and</u> <u>Received - Millions Kwhr</u>	
	<u>Load</u>	<u>% Increase</u> <u>over</u> <u>Previous Year</u>	<u>Load</u>	<u>% Increase</u> <u>over</u> <u>Previous Year</u>
1943	1,467.6		8,716	
1944	1,601.9	9.2%	9,549	9.6%
1945	1,693.6	5.7	9,709	1.7
1946	1,737.9	2.6	9,955	2.5
1947	1,957.8	12.7	11,036	10.9
1948	2,113.4 ^a	7.9	11,191 ^b	1.4

a. July 29, 1948.

b. 12 months ending July 31, 1948.

Two things seem apparent from these estimates. During 1949 margins in northern California will be less than desirable and should a repetition of the recent drought occur, northern California may again

have to look to the south for assistance. It is also evident that with the sustained growth we are experiencing, plans for new capacity to come into operation in 1952 cannot be long delayed.

Fuel Requirements

An increase in the installed fuel-electric plant capacity of the magnitude herein proposed, immediately raises a question as to the adequacy of fuel resources to supply the requisite energy. The proposed plants are being designed to burn gas and oil, the prevalent fuels in California heretofore, and are likewise being laid out for the future use of coal should that become necessary. The company's fuel requirements for the next four years, based upon the load estimates previously discussed, are as follows:

ESTIMATED FUEL REQUIREMENTS

<u>Year</u>	<u>Equivalent Fuel Oil</u> <u>Thousands of Barrels</u>	
	<u>Average</u> <u>Precipitation</u> <u>(1935)</u>	<u>Dry Year</u> <u>Precipitation</u> <u>(1931)</u>
1949	12,247	16,721
1950	12,870	19,636
1951	14,500	21,522
1952	17,263	24,692

The testimony of Pacific with respect to fuel was that no difficulty was anticipated in obtaining the necessary quantities based upon assurances of major oil producers that fuel oil supplies will be adequate to supply the requirements.

Annual Cost

Increased costs of labor and materials which comprise the capital costs involved in constructing new generating facilities, coupled with steadily increasing costs of fuel contribute to a constant uptrend in electric production costs. The annual cost of the energy to be produced by the plants proposed herein is estimated to exceed three-quarters of a cent per kilowatt hour. The derivation of this average cost is as follows:

ESTIMATED ENERGY COSTS

Fixed charges, maintenance and operation	\$18,680,000
Fuel, @ \$1.75 per equivalent barrel of oil	14,350,000
Total annual production cost	<u>33,030,000</u>
Energy produced (70% L.F.) millions of kwhr	4,290 ³ / ₇
Average cost, mills per kwhr	7.7

Construction Schedule

The estimated completion dates of changes in Pacific's installed generating capacity are shown in the following tabulation taken from Exhibit No. 4:

<u>Description of Change</u> (1)	<u>Date Effective Month-Year</u> (2)	<u>Name Plate Rating Kw</u> (3)	<u>Net Dependable Capacity</u> (4)
Station "P" Steam Plant			
First New Unit	Dec. 1948	100,000	100,000
Second New Unit	Jan. 1949	100,000	100,000
West Point Plant-New	Dec. 1948	13,600	13,000
Electra Old Plant	(A)	(20,000)	-
Colgate Old Plant	(B)	(14,200)	(4,700)
Colgate New Plant	July 1949	24,000	23,000
Cresta Plant-New	Nov. 1949	67,500	68,000
Kern Steam Plant			
Second Unit	Feb. 1950	80,000	100,000
Rock Creek Plant-New	Early Spring 1950	113,400	110,000
Potter Valley Improvement	June 1950	-	4,200
Moss Landing Steam Plant, Monterey County			
First Unit	Spring 1950	100,000	100,000
Second Unit	" 1951	100,000	100,000
Third Unit	" 1951	100,000	100,000
Antioch Steam Plant, Contra Costa County			
First Unit	Summer 1951	100,000	100,000
Second Unit	" 1951	100,000	100,000
Third Unit	" 1951	100,000	<u>100,000</u>
Total 1949-1951			1,113,500

(Deduction)

- (A) The old Electra Plant is available for peak capacity and is expected to remain in service until after completion of the West Point Plant and related transmission facilities.
- (B) The present Colgate Plant is expected to be dismantled in the near future, to permit construction of the new plant.

³/₇ 700,000 kw at 70% annual load factor.

From the tabulation, it can be seen that the dependable capacity, if construction programs are completed as planned, will increase 191,000 kw in 1949, 314,200 kw in 1950, and 500,000 kw in 1951.

From the evidence submitted, it is apparent that the new generating capacity, for which certificate is herein sought, is necessary if Pacific is to meet its load demands. Resources for 1949 show relatively minor improvement over 1948 in spite of substantial additions to generating capacity. Load and resource estimates for 1950 and 1951 show substantial improvement in potential margins. Absence of proposed plants beyond 1951 results in a decline in available margins in 1952 and indicates the desirability of crystalizing plans for additional capacity for the period subsequent to 1951. While the two new fuel plants proposed herein can readily be doubled in capacity, it would seem desirable to give serious consideration to developing additional potential hydro facilities, ~~which may be available to Pacific.~~

O R D E R

Public hearings having been held, evidence presented, and the matter being submitted for decision, and upon due consideration the Commission finds that the authority requested by Pacific Gas and Electric Company in this application is reasonable and that public convenience and necessity require and will require that such application be granted; therefore,

IT IS HEREBY ORDERED that Pacific Gas and Electric Company be and it is granted a certificate authorizing it to construct, operate, and maintain the electric production and transmission facilities described in detail in this application comprising primarily the following projects:

1. Kern Steam Plant, second unit, 100,000 kw nominal capacity.
2. Moss Landing Steam Plant, first, second, and third units, 300,000 kw nominal capacity.
3. Antioch Steam Plant, first, second, and third units, 300,000 kw nominal capacity.

The effective date of this order shall be twenty (20) days from and after the date hereof.

Dated at San Francisco, California, this 30th day of November, 1948.

R. Z. [Signature]
Justice J. [Signature]
Justice [Signature]

Commissioners.