

**ORIGINAL**Decision No. 49111

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Investigation upon the Commission's )  
 own motion to ascertain the present )  
 and potential demands for and )  
 availability of electricity in )  
 California, and the need for and )  
 propriety of emergency modification )  
 of current rules or practices to )  
 facilitate the supplying of electric )  
 power and energy. )

Case No. 5284

Appearances and list of witnesses  
 are set forth in Appendix "1".

OPINION AND ORDER

This investigation into the electric power situation in California was initiated by the Commission on April 3, 1951 at a time when the future ability of the electric utilities in California to serve the rapidly growing electric load was questionable. The armed conflict in Korea, which had been under way since June 1950, together with the rapid mobilization for defense, had created a substantial addition to the sharp rate of electric load growth resulting from the rapid postwar gain in California's population. The situation at this time appears sufficiently satisfactory to warrant a temporary, if not permanent, closing of this investigation.

Interim Opinion and Order

After two days of public hearing on July 6, 1951 in Los Angeles and on September 19, 1951 in San Francisco before Commissioner Harold P. Huls and Examiner M. W. Edwards and study of the reports prepared by the respondents and the Pacific Southwest Power Interchange Committee, an interim opinion and order was issued in this investigation on October 31, 1951 summarizing the outlook at that time in the following manner:

"By September, 1951, the new electric load for military and defense programs in the Pacific Southwest Power Area was expanding more rapidly than anticipated in July, 1951. The deterioration in the outlook for electric power margins results from impending delays to construction schedules because of difficulties in obtaining steel and copper to complete the new generating plants as well as the mounting loads. There may be a need for rationing of electric service starting in the summer of 1952 if the year is dry. If there is any further delay in constructing new plants as scheduled, curtailment of new connections immediately may result. The Commission's jurisdiction does not cover all generating agencies in the state. Any curtailment program will require the voluntary cooperation of government, municipal, and out-of-state generating agencies in pooling of resources. Such program will have to be designed to help the areas or systems where shortages first may occur."

The year 1952 turned out to be a very favorable year for the production of hydroelectric energy, one of the best on record, which fact, coupled with a reduced need for agricultural pumping, enabled the growing war, defense and regular load to be successfully carried without need for curtailment of any new load or rationing of power to existing customers.

Four additional days of hearing were held before Commissioner Huls and Examiner Edwards during the interval after September 1951, with July 17, 1953 as the last day of hearing on which the matter was submitted for Commission decision.

#### Current Outlook

In contrast to the excellent hydroelectric situation in 1952 the year 1953 is below normal for the state as a whole. In the most northerly part of California the hydro situation is about 30 per cent over normal but it shades down toward the southern part of the state to about 70 per cent of normal at the southern tip of the Sierra Nevada Mountains. Precipitation on the Colorado River watershed and in southern and central California was deficient during the 1952-1953 climatological season. The hydro resources from the Colorado River plants and in southern California will be substantially below average for the current water year.

There was a work stoppage between March 10, 1953 and May 11, 1953 on the Southern California Edison Company system because of a labor strike which delayed completion of a 125,000-kw unit at Etiwanda Steam Plant to July 10, 1953, originally scheduled for operation early in 1953. The second 125,000-kw unit at Etiwanda is now scheduled for completion in September 1953. A similar work stoppage on the California Electric Power Company system occurred during approximately the same period. However, it had little or no effect on the power capability situation.

There has been some delay in the defense load reaching its peak and the demands have been less than estimated in the year 1952. For example, the December 1952 area peak was 422,000 kw or 5.8 per cent less than that estimated by the interchange committee.

One favorable factor is the improvement in the materials situation since November 1952. Controls on materials progressively have been removed until at the present time all controls have been removed except for certain steel alloys, particularly those containing nickel. This favorable material situation is somewhat offset by a substantial backlog of orders for large steam generators at the manufacturing plants and by certain remaining preference ratings for Atomic Energy Commission and military projects. Because the elapsed time between the placing of an order and the operation of a steam plant is about three years, it is still necessary to continue all efforts to complete the now additions on the scheduled dates and make plans well in advance for new load.

The witness for the interchange committee concluded that in general the margin between generating capacity and demand during the summer and fall months of 1953 will be less than estimated; however, by the use of interchange facilities there are sufficient margins to supply the area demands unless generation failure or some unforeseen emergency should occur.

Need for Power Surveys

Because the margins between estimated demands and generating capacity during the years 1954 and 1955 will be supplied by generating capacity which is now being erected or is on order, it is necessary to survey the situation continually to see that the new equipment is completed and placed in service on schedule. The Pacific Southwest Power Interchange Committee expects to continue to report load and resource estimates for its members and the Commission will be kept advised of the situation as it develops through participation of its staff members in the proceedings of that committee.

During the past 30 years the Commission has witnessed two periods of power shortage in the state in the years 1924 and 1948, when it was necessary to take positive steps to ration the available power and restrict new load connections. During both of these periods a protracted deficiency in rainfall and storage carry-over was a contributing factor. In the latter period, delay caused by wartime restrictions in the construction of new plants was a major cause of the deficiency.

In the past, hydro plants have been the main source of electric energy in California. California's hydro development started in 1893 and was aided by the hydraulic mining industry. Many favorable sites were available along the slopes of the Sierra Nevada Mountains and the more economic sites were developed as fast as the state's electric load grew. With the successful development of long high-voltage transmission lines it was possible to deliver this hydroelectric energy to the large load centers such as San Francisco, Oakland, and Los Angeles and thus handle this load growth on hydro without resorting to large steam plants located at such load centers. In 1936 power from the Colorado River was first brought into southern California.

Also in the past, steam plants were installed primarily for the purpose of firming hydro power and secondarily for the purpose of supplying load growth. The emphasis now is on steam plant additions to meet load growth. Prior to World War II a two-to-one ratio of development of hydro to steam was a customary relationship; however, since the war this trend has reversed with two or more kilowatts of steam being installed for each kilowatt of hydro. The over-all ratio of plant capacity actually serving California load at the present time, however, is still about 1 kw of hydro to 1 kw of steam.

The high relative rate of building of new steam plants should improve the reliability of service so long as fuel is available. Theoretically the steam plant is available all of the time and can operate at 100 per cent load factor. The hydro plant depends on the amount of water available and an extremely low water yield year is always a possibility. Fortunately, these extremely low years have occurred at a frequency of only one in ten years or so. While this is a hazard, obtaining an adequate fuel supply may be more hazardous in the future than risking an occasional low-water year. Fuel oil and natural gas supplies for steam plant generation are expected to contract as demands for refined premium-priced petroleum products and natural gas, also a premium fuel, increase.

Each year more and more of these fuels have to be imported from out-of-state to make up for the retarded growth of production of oil and natural gas in California. Coal as a substitute is not locally available and atomic energy is not commercially available as yet. While the situation apparently is in hand, it is not without risk and the need for continued survey by the Commission and its staff is apparent.

Commission Responsibility

The legislature has charged this Commission in the provisions of the Public Utilities Code with the duty of requiring utilities under its jurisdiction to:

(1)  
 "... furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees and the public."

In the same section the legislature also has required that:

" All charges demanded or received by any public utility, or by any two or more public utilities, for any product or commodity furnished or to be furnished or any service rendered or to be rendered shall be just and reasonable."

As a consequence of these provisions the Commission and the utilities subject to its jurisdiction are confronted with the constant duty of providing maximum adequacy and reliability of service consistent with a minimum reasonable cost. Compliance with these specifications requires continuous engineering, economic studies and development of compromises between engineering perfection and economic necessity.

Generating Agencies

The matter of integrating new plant construction is complicated by the fact that not all of the generating agencies in the state are subject to control by this Commission. Public agencies not subject to control by this Commission have cooperated with the regulated utilities by interconnecting their facilities. Such cooperation promotes the most efficient utilization of electrical generating equipment within the state. Furthermore, interconnections have been made to generating equipment located outside the state in Nevada, Arizona, and southern Oregon.

The larger generating agencies in California under Commission jurisdiction are:

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(1) Section 451.

1. Pacific Gas and Electric Company
2. Southern California Edison Company
3. San Diego Gas and Electric Company
4. California Electric Power Company
5. The California Oregon Power Company
6. Sierra Pacific Power Company

The larger generating agencies not subject to such jurisdiction that serve energy into the California market are:

1. City of Los Angeles
2. United States Bureau of Reclamation Projects:  
Shasta, Keswick, Hoover, Parker and Davis
3. City and County of San Francisco
4. City of Pasadena
5. City of Glendale
6. City of Burbank
7. Imperial Irrigation District
8. Metropolitan Water District of Southern California
9. East Bay Municipal Utility District
10. Merced Irrigation District
11. Modesto and Turlock Irrigation Districts
12. Yosemite National Park

Operation of the production resources of these many agencies is integrated through the Pacific Southwest Power Interchange Committee.

Pacific Southwest Power Interchange Committee

The Pacific Southwest Power Interchange Committee was established during the preparation of this country's defense efforts in the early part of World War II, in 1941, when the need for complete integration of all power resources in the state first became particularly acute. All during the war and during the trying postwar period, this committee has achieved efficient utilization of existing equipment and has facilitated the orderly development and programming of new production facilities to meet the precipitous growth of electric load in the state. Members of this committee have prepared reports of the loads and resources in the Pacific Southwest Power Area from time to time during the progress of this investigation, the latest being presented as Exhibit No. 28, dated March 24, 1953 in this proceeding. At the hearing on July 17, 1953 those estimates were reaffirmed with a few minor changes. The Commission acknowledges and appreciates their efforts. The present membership of the Pacific Southwest Power Interchange Committee is set forth in Appendix "1" herein.

March 1953 Estimate of Interchange Committee

The March 1953 estimate of loads and resources in the Pacific Southwest Power Area includes the interconnected loads and resources in Arizona and Nevada as well as in California. The study may be summarized briefly for the adverse hydro years 1954 and 1955 as follows:

Estimate of Loads and Resources

							Margin:
							for
Resources				Loads and Maintenance:			Reserves
				Peak or:			and New
Fuel	Hydro	Other	Total	Energy:	Maint.:	Total:	Load :

1954 Adverse Hydro Year - Demands in Megawatts

July	5,554	4,053	(75)	9,532	8,344	575	8,919	613
Dec.	6,000	3,889	(75)	9,814	8,462	317	8,779	1,035

1954 Adverse Hydro Year - Energy in Million Kwhr

July	3,489	1,667	(25)	5,131	4,451	252	4,703	428
Dec.	3,784	1,179	(56)	4,907	3,912	185	4,097	810
Year	39,786	16,510	(384)	55,912	46,921	3,214	50,135	5,777

1955 Adverse Hydro Year - Demands in Megawatts

July	6,385	4,243	(75)	10,553	8,964	643	9,607	946
Dec.	6,789	4,075	(75)	10,789	9,046	218	9,264	1,525

1955 Adverse Hydro Year - Energy in Million Kwhr

July	4,032	1,742	(25)	5,749	4,811	305	5,116	633
Dec.	4,264	1,246	(56)	5,454	4,205	163	4,368	1,086
Year	46,960	16,581	(380)	63,161	50,614	3,997	54,611	8,550

(Obligations to other areas)

The margins under average hydro year conditions are greater than under the adverse hydro conditions by roughly 350 to 500 megawatts and by roughly 5 to 6 billion kwhr. The lowest margin shown in the above tabulation percentagewise is 7.3 per cent for the demand in July 1954 which improves to 10.5 per cent in July 1955. On an average year basis the margin in July 1954 is 14.0 per cent which improves to 16.7 per cent in 1955.



New Capacity Program

The new generating capability scheduled for completion during the 1954-1955 period shown in Exhibit No. 28 follows:

<u>1954 Program</u>		<u>1955 Program</u>	
<u>MW</u>		<u>MW</u>	
40	City of Pasadena	176	U.S. Bureau Reclamation
238	City of Los Angeles	414	Pacific Gas & Electric Co.
569	Pacific Gas & Electric Co.	100	Arizona P.S. Co.
100	Arizona Public Service Co.	156	So. Calif. Edison Co.
60	Salt River Power Dist.	145	City of Los Angeles
50	Tucson Gas, Elec. Lt. & Pwr.	40	Calif. Elec. Power Co.
156	So. Calif. Edison Co.		
106	San Diego Gas & Elec. Co.		
<u>1319</u>	<u>Total</u>	<u>1031</u>	<u>Total</u>

The above total of 1319 megawatts in 1954 represents an increase of approximately 15 per cent when referred to the capability at the beginning of the year. Compared to an estimated load growth of approximately 11 per cent, an indicated improvement in margin position of about 4 per cent should be realized.

Commission Staff's Study

The Commission staff had made a summary study of the loads and generating resources of the State of California for the years 1952, 1953 and 1954 and presented it as Exhibit No. 31 in this proceeding. In determining the California load, allowance was made for out-of-state loads. The staff report was set up to show the margin for reserve and new load on a percentage basis. A summary of the range of margins as found and estimated by the staff follows:

State of California - Power Margins

	<u>Demand</u>				<u>Energy</u>			
	<u>Low Margin</u>		<u>High Margin</u>		<u>Low Margin</u>		<u>High Margin</u>	
	<u>Pct.:</u>	<u>Month:</u>	<u>Pct.:</u>	<u>Month:</u>	<u>Pct.:</u>	<u>Month:</u>	<u>Pct.:</u>	<u>Month:</u>
1952 Actual Year	10.2	Sept.	19.6	May	23.3	Oct.	48.0	Apr.
1953 Adverse Year	4.6	Apr.	15.4	Jan.	10.0	Oct.	30.8	Jan.
1953 Average Year	6.1	Apr.	17.5	Nov.	14.4	Mar.	32.0	May
1954 Adverse Year	8.0	Sept.	17.3	Nov.	6.0	Feb.	22.6	Dec.
1954 Average Year	9.2	Jan.	21.3	Nov.	13.9	Feb.	34.2	May

The staff's study showed increases in production at generation had risen from 12,535,000,000 kwhr in 1940 to 34,935,000,000 kwhr in 1952 with yearly increases running as high as 18.0 per cent during the war year 1943. For the year 1953 an increase of 9.3 per cent is forecast and for 1954 an increase of 8.1 per cent is forecast. The forecast load figures for 1954 for the state are: maximum demand 7,471,000 kw, energy 41,281,000,000 kwhr, and load factor 63.1 per cent.

The conclusions of the staff's study are:

"The state's load-resource relationships during 1953 and 1954 bear adequate margins and no power shortage should occur in either northern or southern area, even under adverse hydro conditions, provided full use is made of existing interconnections between areas.

"To meet the requirements of the state and provide margins during 1953 and 1954, however, the scheduled additions to generating plant must be made in strict accordance with present schedules.

"The scheduled generating plant additions during 1953 and 1954 will not result in excessive margins. At present there appear to be no indications of a decrease in the rate of growth of electrical load in California. It follows that the rate of plant additions must be maintained or perhaps increased if the resources are to keep pace with the load growth in the future."

#### Pacific Northwest Interconnection

The advantages of an interconnection from the Pacific Northwest to California was pointed out by a representative of the Bureau of Reclamation who stated that the Bureau is vitally interested in augmenting the power supply. He described a proposed 119-mile, 230 kv tie between the Bonneville Power Administration system in the vicinity of Klamath Falls and the Shasta project which would connect the transmission pool in the Pacific Northwest with the transmission pool in California.

According to the Bureau's witness the advantages would result from the transmission of otherwise unusable excess hydro energy from

the Pacific Northwest to California during seasonal high water and off-peak periods on the Columbia River system, and transmission of steam power from California to the Pacific Northwest in low-water periods on the Columbia River. Diversity of period of runoff between basins offers an advantage to both areas, in his opinion. Exhibit No. 15 shows that an estimated 440,000,000 kwhr of excess hydro energy could be delivered to California and during a 6-month's low-water period in the Pacific Northwest an estimated 200,000,000 to 400,000,000 kwhr of steam energy could be delivered to the Pacific Northwest.

#### Industrial Energy Survey

The California Manufacturers Association presented the results of a survey of electric energy use by manufacturers in California, covering the actual year 1950 and estimates for the years 1951-1954 as Exhibit No. 19 in this proceeding. The survey was based on questionnaires, answers to which were received from 706 manufacturing plants. The results for the state as a whole were:

<u>Estimated Increase in Future Electric Energy Requirements Compared to 1950</u>	
<u>Year</u>	<u>Weighted Average Increase</u>
1951	15.7%
1952	25.4%
1953	32.8%
1954	38.1%

The increase of 7.4 per cent between 1952 and 1953, and 5.3 per cent between 1953 and 1954 are slightly lower than the over-all load growth rates estimated by the staff but do not indicate the staff's estimates are unreasonably high. The Commission appreciates having an independent check on load growth for a class of customers that comprise large and important users of energy in the state.

#### Conclusion

After reviewing the evidence presented by representatives of

the utilities, industry, generating agencies and the staff it is the conclusion of the Commission that during the 30-month period while this investigation has been in progress the electric power situation has improved in California and that margins for the foreseeable future appear adequate so long as new generating plants are completed on schedule. The armed conflict in Korea presently is in a state of truce, which possibly may tend to lessen somewhat the load growth in the future, thereby resulting in still further improvement in the margins of capacity above load. The risks of an extremely dry year or restriction in fuel supply are continually with us. California has achieved important economies in generation by interconnection of different utility systems and areas and with the ever-increasing ratio of new steam to hydro construction in California the risks inherent in an extremely dry year are diminishing.

Representatives of the utilities urged the Commission to give consideration to issuance of a final order terminating this proceeding. Comments by several parties indicated that the most difficult period of obtaining essential materials and installing essential production equipment appears to be past and the situation should improve in the future. The staff will be advised of the situation as it develops through attendance at the meetings of the Pacific Southwest Power Interchange Committee. One large utility representative assured the Commission that his utility would take every action necessary to assure adequate power supply for northern and central California. No objections to the termination of the proceeding at this time were made by representatives for agriculture and for industry. In view of these statements and assurances by the various respondents and interested parties this proceeding will be terminated. The appreciation of the Commission for cooperative participation is extended to all persons, representatives and staff members who aided in this investigation. ✓

ORDER

The Commission, on its own motion, having instituted an investigation to ascertain the present and potential demands for and availability of electricity in California, and the need for and propriety of emergency modification of current rules or practices to facilitate the supplying of electric power and energy, and it being the opinion of the Commission that the power situation has improved sufficiently to permit termination of this investigation without need for modification of current rules or practices, public hearings having been held, request for closing of this investigation having been made and the Commission now being fully advised; therefore,

IT IS ORDERED that the investigation herein be and it hereby is terminated and dismissed.

IT IS FURTHER ORDERED that the Secretary of the Commission shall serve copies of this decision upon the appearances of record herein and shall mail copies of said decision to the Governor of the State of California, members of the Senate and Assembly of the State of California, to members from California of the Senate and the House of Representatives of the United States of America, to members of the Pacific Southwest Power Interchange Committee, and to the members and Secretary of the Federal Power Commission, Washington 25, D.C.

The effective date of this order shall be twenty days after the date hereof.

Dated at San Francisco, California, this 22<sup>nd</sup> day of September, 1953.

[Signature]  
PRESIDENT  
[Signature]  
[Signature]

Justus F. Cramer  
Commissioner... Peter E. Mitchell, being necessarily absent, did not participate in the disposition of this proceeding.

COMMISSIONERS

## APPENDIX "1"

### LIST OF APPEARANCES

Respondents: Pacific Gas and Electric Company, by Ralph W. DuVal, and Frederick T. Searls; Southern California Edison Company, by Wayne N. Johnson, Bruce Renwick, and Rollin E. Woodbury; San Diego Gas and Electric Company, by Harold A. Noble and Sherman Chickering; Pacific Southwest Power Interchange Committee by H. A. Lott.

Interested Parties: California Electric Power Company, by Willis T. Johnson; Bureau of Reclamation, Region II, by Oliver O. Rands and G. Pierce; California Manufacturer's Association, by George D. Rives and J. J. Pilockas; California Farm Bureau Federation, by J. J. Deuel; Light and Power Department of the City of Pasadena, by T. M. Goodrich; Coast Counties Gas and Electric Company, by Joseph E. Sheeks and W. E. Johns; Eleventh Naval District, by J. M. Beauchamp; Twelfth Naval District, by Alvin K. Mann; Navy Department, Department of Defense, and all executive agencies of the U.S. Government, by Charles Goodwin and George Spiegel; Department of Water and Power, City of Los Angeles, by Ivan L. Bateman; Metropolitan Water District of Southern California, by E. W. Rockwell; City of Glendale, by L. W. Grayson; City of Burbank, Public Service Department, by J. H. McCambridge; City and County of San Francisco, by Dion R. Holm and Paul L. Beck; City of Oakland, by John W. Collier and Loren W. East; City of Berkeley, by Fred C. Hutchison and Robert T. Anderson; Federal Power Commission, by I. J. Rees; Crown ByProducts Company and Challenge Cream and Butter Association, by W. D. MacKay; Riverside Cement Company, by Lauren M. Wright.

Commission Staff: L. R. Knerr, Electrical Engineer.

Other Appearances: George R. Boll of the Federal Power Commission, an observer; George Pierce of Bureau of Reclamation, as an individual.

### LIST OF WITNESSES

Evidence was presented on behalf of the Pacific Southwest Power Interchange Committee by H. A. Lott, Chairman; on behalf of the Southern California Edison Company, by W. N. Johnson; on behalf of the San Diego Gas and Electric Company, by E. D. Sherwin; on behalf of the California Electric Power Company, by W. T. Johnson; on behalf of the Metropolitan Water District of Southern California, by E. W. Rockwell; on behalf of the Department of Water and Power, City of Los Angeles, by Ivan L. Bateman, T. M. Blakeslee and Carl Kist; on behalf of the City of Glendale, by L. W. Grayson; on behalf of the City of Burbank, by J. H. McCambridge; on behalf of the City of Pasadena, by T. M. Goodrich; on behalf of the Pacific Gas and Electric Company, by I. W. Collins; on behalf of Region II, U. S. Bureau of Reclamation, by O. O. Rands; on behalf of U. S. Navy, by A. K. Mann; on behalf of the California Manufacturers Association, by H. R. Ross; on behalf of the Commission's staff, by Harold T. Sipo.

### LIST OF MEMBERS OF THE PACIFIC SOUTHWEST POWER INTERCHANGE COMMITTEE

H.A. Lott, Chairman, Southern California Edison Company;  
L.R. Knerr, California Public Utilities Commission;  
Ralph Foy, City of Burbank;  
G. H. Hagar, Pacific Gas and Electric Company;  
E. W. Rockwell, Metropolitan Water District of Southern California;  
H. A. Noble, San Diego Gas and Electric Company;  
W. T. Johnson, California Electric Power Company;  
L. W. Grayson, City of Glendale;  
T. M. Goodrich, City of Pasadena;  
B. A. Weiss, Imperial Irrigation District;  
Ivan L. Bateman, Department of Water and Power, City of Los Angeles;  
W. H. Taylor, U.S. Bureau of Reclamation, Region III;  
Noel Pike, Arizona Power Authority;  
George Horsh, Arizona Public Service Company;  
G. W. Brandow, Salt River Power District;  
M. N. Lovell, Tucson Gas, Electric Light and Power Company.