

Decision No. 38090

BEFORE THE RAILROAD COMMISSION OF THE STATE OF CALIFORNIA.

In the Matter of the Application of SOUTHERN CALIFORNIA EDISON COMPANY LTD., for a certificate that present and future public convenience and necessity require or will require the construction and operation of Applicant's electrical generation, transmission, and distribution system to render sixty cycle alternating current service, and for an Order fixing said frequency as a standard for said system, and authorizing discontinuance of fifty cycle alternating current service in territory served by Applicant.

ORIGINAL

Application No. 26791

Gail C. Larkin and R. E. Woodbury, for Applicant.

C. W. Cornell, for Pacific Electric Railway Company.

J. J. Deuel and Edson Abel, for California Farm Bureau Federation.

Albert H. Miller of Techarner & Miller, City Attorneys, for City of Azusa.

Joseph T. Enright, for Monolith Portland Cement Company.

Martin C. Casey, for City of Colton.

Irving M. Smith, City Attorney, and Joseph B. Lamb, Deputy City Attorney, and J. J. McHenry, for Bureau of Franchises and Public Utilities, for City of Long Beach.

Carl Heinze, for City of Vernon.

M. Tellefson, City Attorney, for Culver City, Montbello, and Hermosa Beach.

Miguel Estudillo, City Attorney, Albert H. Ford, Deputy City Attorney, for City of Riverside.

E. R. Griffin, City Attorney, for City of San Bernardino.

ANDERSON AND ROWELL, COMMISSIONERS:

O P I N I O N

Southern California Edison Company Ltd., in this proceeding, asks the Commission to determine that public convenience and necessity require

Edison to render alternating current electric service to all of its customers at a uniform system-wide frequency of 60 cycles. ⁽¹⁾ Supplemental to this general authorization and to effectuate the conversion, Edison seeks authority to cease delivering 50-cycle energy at the time 60-cycle energy is available, to undertake the reconstruction of its own system, to assist its customers in adapting their utilization equipment, to amend its tariff schedules, and to defray the major portion of the costs involved.

Edison is engaged in generating, transmitting, distributing, and selling electric energy, as a public utility, in portions of central and southern California. Fifty-cycle alternating current electric service is supplied throughout its southern California territory. In the San Joaquin Valley area, 60-cycle service is available except in the Shaver Lake and Huntington Lake areas, and in Kernville and vicinity where 50-cycle service is rendered. Ninety-three per cent of Edison's 631,000 customers receive service at 50 cycles.

A public hearing of the application was held at Los Angeles on July 9, 1945. Wide publicity was given to this hearing. In addition to the formal notice published throughout the territory and the substantial number of stories appearing in the news columns of the papers, special notice was sent to each city receiving 50-cycle service and to industrial customers whose connected load exceeds 500 hp. No one appeared at the hearing to protest the broad policy of conversion. Certain business men appeared as advocates of the proposal and the California Farm Bureau Federation expressed the view that the change be made at the earliest practicable date.

The testimony shows that Edison is the only large electric power utility in the United States now operating at 50 cycles. San Diego Gas and

⁽¹⁾ A witness for Edison defined the term as follows:

"A cycle is the length of time required for the generation of one complete positive and negative wave of an alternating current. The number of these cycles in one second is the measure of the frequency of an alternating current..... This speed, or frequency of alternation is determined, first, by the design of the generators supplying power to the electrical system and, second, by the speed at which the rotor of the generator rotates."

Electric Company and California Electric Power Company furnish 60-cycle energy in adjacent areas in southern California. Since 1936, the municipal electric systems operated by the cities of Los Angeles, Pasadena, Burbank, and Glendale have adopted a 60-cycle frequency through a program similar to the one herein proposed. Edison, therefore, and the four municipal systems served at wholesale by them, are the only electric operations in California rendering other than 60-cycle service. It is obvious, therefore, that the conversion must, of necessity, result in general benefit to the entire southern part of the state, including not only Edison and its customers, but also the other electric utilities and the public at large.

Much of the hydro production equipment and portions of the steam production equipment of Edison have been designed for operation at either 50 or 60 cycles. The generating facilities at Boulder Dam are likewise suitable for 60-cycle operation by making relatively minor changes in the turbine runners. Including changes to transmission and distribution facilities, the cost of converting Edison's own plant is estimated by its engineers to be \$5,116,000. As a result of the conversion, Edison will effect certain economies and efficiencies which, to a large extent, will economically justify the costs incurred for changes to its own plant. Testimony shows that transformer losses will be reduced, capacity of synchronous condenser equipment can be augmented with machines released from frequency changer duty, and frequency changer losses can be eliminated. Barriers to power interchange which have heretofore existed between the respective electrical systems in southern and central California will be removed. Interchange of electric energy has heretofore taken place between Edison and the other systems through frequency changers, by physical isolation or transfer of plant, but such interchange will be far less restricted if all systems operate at a uniform frequency. Standby and reserve facilities of several systems can more completely augment one another. Utilization of secondary energy on the various systems will be facilitated. Cost premiums for nonstandard 50-cycle equipment can be avoided. Economic differentials favoring 60-cycle designs of certain large special electric apparatus can be realized.

Edison has recognized the desirability of and given consideration to this change for a number of years but until the cities of Los Angeles, Pasadena,

Burbank, and Glendale abandoned 50-cycle service in 1936 and, subsequently, the problem was not acute. The result of this conversion on the part of the cities was that thereafter approximately half of the electric customers in southern California received energy at 60 cycles and the balance was served at 50 cycles. Recent years have likewise seen a rapid growth in the usage of frequency sensitive equipment. These two factors have resulted in increasing inconvenience to the substantial portion of the population who find it necessary to move their residences between areas of different frequencies. The record further shows that manufacturers exact a price premium for 50-cycle equipment and that, at present, many manufacturers are reluctant to produce any 50-cycle equipment because of the restricted market. Dealers serving both populations find it costly and troublesome to carry two inventories and often find that their customers are uncertain as to whether they need 50 or 60-cycle appliances. Because the use of frequency sensitive equipment is increasing at such a rapid pace, each succeeding estimate of costs to adapt these appliances from 50 cycles to 60 cycles reveals a substantial increase.

Without a doubt the increase in use of fluorescent lighting which must be designed for either 50 or 60-cycle operation, together with the prospective use of television which is likewise designed for a single frequency, would result in the continuation of the trend of increasing costs if conversion is postponed to some later date. It would generally be impractical to render service to customers at either 50 or 60 cycles at the customer's option without a very expensive duplication of plant.

Edison estimates the direct cost of adapting customers' utilization equipment for satisfactory operation at 60 cycles to be \$15,427,000. One of the important problems in this proceeding is to determine the extent to which Edison should share in the costs involved in this adaptation. Some of the principal changes are: (1) all clocks and timing devices, (2) approximately twenty per cent of all customers' washers and refrigerators, (3) approximately 8,000 agricultural installations, predominately pumps, and (4) over 200 large industrial users having a large variety of equipment, much of which is frequency sensitive, including the facilities of the Pacific Electric Railway and the Los Angeles transit lines, whose combined connected load exceeds 100,000 kilowatts.

The specific changes necessary in individual cases must be determined by a detailed engineering survey which may require as much as eighteen months to complete.

Physical work involved in making the cutover will follow this survey and according to present plans will consume approximately three years.

Edison has indicated its general intention of assuming the burden of the direct costs of converting consumers' appliances and equipment and has suggested in its application certain methods by which it would undertake this obligation. Until more complete understanding of the many problems involved can be obtained, it would appear reasonable to hold in abeyance final conclusions with respect to such details. It is obviously reasonable that Edison be required to adapt or assist its consumers in adapting their appliances to the new frequency, but in doing so, it must be governed by uniform nondiscriminatory procedures which will provide the maximum assistance to its consumers and at the same time treat all alike. The substantial cost of adapting these appliances must be justified largely by the removal of inconvenience to its customers; by making available to them a uniform standard frequency, and by the savings its customers will derive by avoiding premiums charged for 50-cycle apparatus. Obviously, certain delays and inconveniences to its consumers will arise during the actual cutover period. Edison does not propose to compensate its customers for any loss of business which might arise incidental to the cutover. In our opinion, this position appears warranted.

A somewhat different situation applies to the four cities of Riverside, Azusa, Colton, and Anaheim, who purchase energy at wholesale from Edison and, in turn, retail it through distribution facilities owned by the cities. Testimony shows that Edison originally anticipated assuming the burden of adapting appliances owned and operated by the cities without bearing any of the costs associated with adapting the appliances of the cities' consumers. Edison's president, however, at a recent conference with representatives of the cities, made the further offer to assume one-half the costs of converting the appliances of the cities' consumers. This, in our opinion, is likewise a detail which should be held in abeyance and will be one of the problems on which the Commission will reserve jurisdiction. This, we believe, will satisfy the apprehension expressed by some of the cities.

Edison filed a series of exhibits containing proposed amendments to some of its tariffs and rules and regulations which were designed primarily to make the language of the tariff schedules consistent with the proposed change. No changes in rates were proposed in the amendments. The change from 50 to 60 cycles in itself will not result in an increase in rates or charges for a given quantity of electric energy. In view of the type of order contemplated herein, there seems to be no need to specify at this time changes which Edison should make in its tariff schedules. It may, if it chooses, at once file a single supplement amending its preliminary statement, calling attention to this decision and indicating that the conversion of frequency is anticipated and that all of its tariffs are subject to revision in accordance with the order herein and subsequent orders on related matters. In the event this is done, some plan of advising and keeping advised all of its customers, to whom the notice applies, should be developed. Changes in the body of the tariffs may, at Edison's convenience, be submitted for approval in a supplemental application.

Edison in Exhibit "4" estimates the cost of the proposed conversion at \$20,543,000. Of this sum, \$5,116,000 would be expended for the purpose of converting and improving its electrical apparatus and machinery and \$15,427,000 to make the necessary changes on consumers' equipment. The estimated costs are subject to revision because of changes in labor and material costs and consumer uses between now and the completion of the conversion. The testimony shows that the expenditures fall into five classes, as follows:

1. Additions to Edison's plant.
2. Changes in Edison's plant which increase plant capacity or efficiency of operation.
3. Changes in Edison's plant which modernize or extend the life of the facility.
4. Changes in Edison's plant which are purely incidental to cycle change and which will not result in increase in capacity, improved efficiency or effect the life of the facility.
5. Changes on consumers' premises.

Expenditures falling into classes one, two, and three amounting to about \$4,000,000 cover additions and improvements to and changes in Edison's properties. Such expenditures should be recorded in the manner provided in the Uniform System of Accounts for Electrical Corporations prescribed by the Commission. The

remainder of the expenditures amounting perhaps to \$16,500,000 are operating expense charges. The amount is so large as to make it impractical to write it off during the years incurred. Edison asks permission to charge to Account 141 "Extraordinary Property Losses," a suspense account, expenditures falling into classes four and five and write them off through the use of Account 506 "Property Losses Chargeable to Operations." In view of the fact that the actual cost of performing the work may vary substantially from the estimated costs, we will not at this time fix the period of time during which the amounts included in Account 141 should be amortized. That period will be fixed when Edison is in a position to present more accurate cost estimates. Edison agrees that pending such showing it will extinguish concurrently through Account 506 the expenses incurred and included in Account 141.

From a review of evidence and testimony in this proceeding, it is apparent that the change of Edison's system contemplated in this application is in the public interest. The problem has been apparent for many years. The same circumstances, though appreciably less aggravated, compelled a similar change in the operations of the cities of Los Angeles, Pasadena, Burbank, and Glendale in 1936. Public opinion, in so far as it could be ascertained, is favorably disposed toward the change.

To satisfactorily accomplish the conversion, it is incumbent upon not only the utility for the responsibility of developing and activating a sound and workable program, but likewise upon each of the consumers to cooperate and assist to the fullest extent.

The Commission is fully cognizant of its responsibilities in connection with the undertaking. We will maintain continuing jurisdiction in this proceeding until the conversion is an accomplished fact. Edison will be expected to present to us comprehensive outlines of the several phases of the program so that the general principles and methods of procedure will have our approval, and such procedures once approved should not be deviated from except by authority of the Commission.

O R D E R

A hearing having been held, evidence and testimony presented, the matter having been submitted for decision, and the Commission being of the opinion that the application should be granted, therefore,

IT IS HEREBY FOUND AS A FACT that present and future public convenience and necessity require or will require the Southern California Edison Company Ltd. to furnish alternating current electric service to each of its customers at a uniform system-wide standard frequency of sixty (60) cycles and at such time as said service is available to cease furnishing service at a frequency of fifty (50) cycles.

Based upon the above finding of fact, IT IS ORDERED that Southern California Edison Company Ltd. be and it is hereby authorized and directed:

1. To render to each of its customers alternating current electric service at a system-wide standard frequency of 60 cycles, to proceed to cutover its present 50-cycle system pursuant thereto and to cease rendering 50-cycle service at such time as it is in position to render 60-cycle service in lieu thereof.
2. To submit, by supplemental application herein, appropriate amendments or supplements to its filed tariffs necessitated by or consistent with the conversion of service to a 60-cycle standard.
3. To assume in addition to the conversion costs of its own equipment, the direct costs of adapting consumers' appliances for proper operation at a frequency of 60 cycles, provided that when a customer desires to replace the appliances with new equipment or the remaining life of the appliances does not justify adjusting same the customer shall pay an amount to be determined in accordance with principles to be established by supplemental order herein.
4. To account for the cost of reconstructing and adjusting its electric generation, transmission, and distribution facilities in the manner provided in the Uniform System of Accounts for Electrical Corporations prescribed by the Railroad Commission, except that amounts which under that system of accounts would be charged to operating expense accounts may be charged to Account 141 "Extraordinary Property Losses." To said Account 141 shall also be charged the cost incurred by Edison to adjust the frequency sensitive equipment and appliances owned by consumers. Pending the fixation of a period during which the amounts included in said Account 141 shall be amortized by charges to Account 506 "Property Losses Chargeable to Operations," any amount included in said Account 141 shall be extinguished through said Account 506 as incurred.
5. To file with the Commission, semiannual reports showing the progress made in consummating said cutover program, the expenses incurred during said semiannual period, and the account or accounts to which said expenses were charged. The first of such reports shall be filed on or before February 28, 1946, covering the work performed and expenses incurred from the effective date of this decision to December 31, 1945.

The Commission reserves jurisdiction in this proceeding to enter such further orders as may be deemed necessary and appropriate.

The authority herein granted shall become effective twenty (20) days from the date hereof.

The foregoing opinion and order are hereby approved and ordered filed as the opinion and order of the Railroad Commission of the State of California.

Dated at San Francisco, California, this 27th day of July
1945.

David Anderson
Justin F. Coe

Harold C. ...

Irving ...

(Commissioners)