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Decision 91-11-057 November 20, 1991

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Investigation on the Commission's Own Motion to Implement the Biennial Resource Plan Update Following the California Energy Commission's Seventh Electricity Report.	I.89-07-004 (Filed July 6, 1989)
And Related Matters.	Application 91-02-092 Application 91-07-004 Application 91-08-028

ORIGINAL

(See D.91-06-022 for a list of appearances.)

INTERIM OPINION (METHODOLOGY PHASE) ON ENERGY RELIABILITY INDEX FOR SOUTHERN CALIFORNIA EDISON COMPANY

I N D E X

INTERIM OPINION (METHODOLOGY PHASE) ON ENERGY RELIABILITY INDEX FOR SOUTHERN CALIFORNIA EDISON COMPANY

I. Summary

In today's decision, we adopt a floor/ceiling methodology to calculate the Energy Reliability Index (ERI) for Southern California Edison Company (Edison). This ERI methodology should be applied to our decisions in Edison's Energy Cost Adjustment Clause (ECAC) proceedings until further action is taken by this Commission.[1]

Edison's ERI will have a ceiling of 1.0 and a floor of 0.1. The ceiling price will be paid whenever Edison's projected reserve margin for the forecast year is equal to or less than the target reserve margin. The ERI will decline exponentially as the projected reserve margin increases above the target until it reaches the floor of 0.1. At or beyond that point, the ERI will be the floor value of 0.1.

II. Background

A. The Role of the ERI in Capacity Valuation

The ERI is a number used to quantify the value of added capacity to an electric utility's system. In order to quantify the value of this capacity, we begin by using the cost of the utility's marginal capacity investment, which is assumed to be a combustion turbine (CT). We then use the ERI to adjust the cost of the CT to reflect the value of added capacity to a utility's system.

1 We anticipate a generic review of short-run marginal cost methodology for the three large electric utilities later in the Biennial Resource Plan Update.

We developed the ERI for the following reasons. During the beginning phase of standard offer development,[2] we became convinced that paying qualifying facilities (QFs) the exact annualized value of the utility's marginal capacity investment, as represented by a CT, irrespective of the utility's reliability requirements, would not make economic sense. In a competitive market, prices continually adjust to changing conditions of surplus and scarcity. We reasoned that the cost of a CT, therefore, required an adjustment mechanism in order for QF capacity payments to properly reflect the utility's need for additional capacity. (See Decision (D.) 82-12-120, 10 CPUC 2d 553, 602; D.83-12-068, 14 CPUC 2d 15, 220.) The ERI is such a mechanism.

Over the past decade we have developed an ERI for each large electric utility. The ERI is "a way of expressing whether the value of additional capacity on an electric utility system in a given year is the same as, or greater or less than, the utility's marginal capacity investment, assumed to be a combustion turbine." (D.86-11-071, 22 CPUC 2d 311, 315.) Thus, the ERI is a scale factor which, when multiplied by the annualized value of the CT, yields a simulated market value for reliability. This simulated market value is termed "shortage value" or "shortage cost."

2 The concept of an ERI is rooted in our longstanding and continuing efforts to implement marginal cost pricing in electric utility regulation. As part of these efforts, we developed a series of standard offers. In some standard offers, utilities purchase as-available capacity from qualifying facilities (QFs). Payments under these offers consist of energy and capacity components. The capacity component indicates the value that QFs represent to system reliability. Today's decision does not address the energy component.

B. Reexamination of Edison's "One/Zero" ERI Methodology

On July 2, 1991, we issued D.91-07-015, which addressed the Geothermal Resource Association and Independent Energy Producers Association's (GRA/IEP) petition for modification of D.90-12-067, the Commission's order in Edison's ECAC proceeding for forecast year 1991. In their petition, the GRA/IEP alleged that D.90-12-067 erred by setting the price paid by Edison to QFs for as-available capacity at zero, based on the decision's adopted value of zero for the ERI.

Edison's "one/zero" methodology compares Edison's reserves for the period under consideration to Edison's target reserve margin. If reserves exceed Edison's target reserve margin by more than five percentage points, the ERI is determined to be zero. If the reserves equal or are less than the target reserve margin, the ERI is 1.0. The relationship is linear between the two points. Edison explained this approach as "based on a linear 'one/zero' approximation of the exponential relationship between the ERI and the reserve margin [and] offered in the interest of computational feasibility." (D.91-07-015, mimeo. at 2.)

We noted that Edison's last general rate case decision had endorsed the simplified "one/zero" approach to calculating the ERI. (Id., at 2, citing D.87-12-066, 26 CPUC 2d 392, 509-512.) We also noted that the general rate case method was used in subsequent Edison ECAC proceedings and resulted in zero ERI values in Edison's last two ECAC proceedings.

However, we also stated that Edison's "one/zero" methodology "may be in conflict with [the Commission's] long-standing finding...that additional capacity always has some value," and that the "one/zero" approximation may also conflict with several subsequent Commission decisions. (Id.) We denied GRA/IEP's petition for modification of D.90-12-067 without prejudice. We then invited GRA/IEP and other parties from the Edison ECAC Application (A.) 90-06-001 to review the "one/zero"

methodology in the Biennial Resource Plan Update (BRPU). We stated that we intended to apply any resulting change in policy to our decision in Edison's current ECAC proceeding, A.91-05-050.

Accordingly, the Assigned Administrative Law Judge (ALJ) issued a July 11, 1991 ruling setting expeditious hearings on the following issues as they relate to Edison only[3]:

> "What should be the appropriate methodology for calculating Edison's ERI? Subsumed in this issue are the following sub-issues:
>
> "a. Is Edison's 'one/zero' methodology for computing the ERI approved by Commission decision(s)?
>
> "b. Should Edison's 'one/zero' methodology be changed, and if so, how?
>
> "c. Should Edison's ERI be determined with or without a floor and/or ceiling value?" (July 11, 1991 ALJ Ruling Regarding Edison's ERI at 3.)

We also stated that the hearings should address the ERI only, and would not concern the calculation of expected unserved energy (EUE) or the selection of an EUE target. (Id.)[4]

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3 Testimony at the ensuing hearings addressed the ERI issue as it relates to Edison only. The hearings did not address ERI issues for any other utility.

4 EUE is an analytical technique used to measure system reliability in terms of the likely quantity of an electric utility's unmet demand in a given time span. As we stated in D.86-11-071, "[t]he concept of 'Expected Unserved Energy' is probabilistic: there is always some chance that a given utility system might not meet demand in given circumstances. When we model utility systems in order to quantify EUE, we are definitely not saying that any demand will in fact go unserved. . . . What we are trying to define through use of a reliability target expressed in EUE is a level of tolerable risk." (22 CPUC 2d 311, 314-315.)

Hearings on these issues were held in San Francisco on August 28 and 29, 1991. The parties[5] served concurrent post-hearing briefs on September 16, 1991, at which point this matter was submitted for decision.

Pursuant to Public Utilities Code Section 311 and Rule 77.1 of our Rules of Practice and Procedure, the ALJ's Proposed Decision was published on October 7, 1991. Parties have had an opportunity to file comments and reply comments. We received comments from Edison, which we have carefully considered. We adopt the principles set forth in Sections IV, A and IV, B, 1, of the ALJ's proposed decision. However, we have adopted a floor value of 0.1 for Edison's interim ERI for the reasons set forth in Section IV, B,2.[6]

III. Positions of the Parties

A. Edison

Edison believes that its current linear "one/zero" methodology is approved by past Commission decision. However, in these hearings, Edison proposes a modified methodology for its ERI. Edison proposes using an EUE-based ERI, which declines exponentially with increasing reserve margins, but always shows a

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5 Edison, GRA/IEP, the California Large Energy Consumers Association (CLECA), and this Commission's Division of Ratepayer Advocates (DRA) all filed testimony, participated in the hearings, and filed post-hearing briefs. San Diego Gas & Electric Company (SDG&E) did not present testimony or cross-examine witnesses, but filed a post-hearing brief.

6 We have also made typographical and grammatical changes to the proposed decision where necessary.

positive (non-zero) value for capacity.[7] Edison proposes that its ERI methodology should not contain a floor, but that its ERI should contain a ceiling of 1.0. For 1992, Edison's ERI would be 0.006, which corresponds to $0.48 per kilowatt-year.

B. GRA/IEP

GRA/IEP argue that Edison's current "one/zero" methodology for computing its ERI is not approved by our prior decisions. GRA/IEP state that Edison's "one/zero" methodology should be changed and recommend, for the interim, that the Commission look to Edison's actions and statements to develop a proxy for the value of capacity provided by QFs. GRA/IEP recommend that a more rigorous methodology for determining Edison's ERI be a topic of Phase 3 of the BRPU.[8] In the interim, GRA/IEP recommend that we adopt for Edison's ERI a schedule of ERIs used by this Commission in D.89-01-019 to evaluate the cost effectiveness of a contract between Edison and the Bonneville Power Administration (BPA). Specifically, those ERIs would be 0.64 for 1992, 0.67 for 1993, and 0.90 for 1994.[9]

If we do not adopt this interim approach, GRA/IEP propose that we adopt the same methodology we adopted for PG&E in D.89-06-048. This ERI methodology consists of an exponential decline, bounded by a floor of 0.4 and a ceiling of 1.0.

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7 Edison recommends that its ERI be set equal to the following equation, ERI = e**-0.5x, where x equals excess reserves, in percent above the target reserve margin, and e is the base of the natural system of logarithms, or approximately 2.7.

8 In that regard, GRA/IEP recommend that Edison's ERI should ultimately be determined with both a floor and a ceiling, in order to mitigate volatile swings in ERI value, which would cause swings of revenue streams to QFs and rates to ratepayers.

9 From 1995 on, the ERI is set at 1.0.

C. CLECA

CLECA states that although we have recently approved the use of Edison's "one/zero" ERI methodology, a historical analysis of other Commission decisions suggests that this approval was both inconsistent with our earlier policy statements and was inappropriate. CLECA cites many actions taken by Edison or this Commission which it argues indicate that capacity always has some positive value. These actions include the fact that Edison regularly buys "spot" capacity (short-term capacity) from other utilities and that this Commission has authorized Edison to buy capacity and energy for demand side management despite Edison's ostensible excess capacity.

CLECA proposes that we revise the methodology for determining Edison's ERI to include the following factors:

"(a) a floor greater than zero reflecting the fact that capacity always has value;

"(b) a formula which approaches the floor gradually and asymptotically as the reserves exceed the target reserve margin; and

"(c) continuation of a ceiling of 1.0 as long as excess reserves seem probable and as a balance to the existence of a non-zero floor."

CLECA does not recommend a specific floor value.

D. DRA

DRA states that Edison's "one/zero" ERI methodology is contrary to our other goals and findings, and recommends that it should be changed. DRA recommends that Edison's methodology be changed to a ceiling of 1.0 and a floor of 0.2, and that we take the current "linear approximation" methodology back one step and use the underlying exponential relationship itself when the ERI value falls between 0.2 and 1.0.

DRA states several rationales justifying a 0.2 floor including the statement that a mid-range of Edison's short-term capacity purchases equates to a slightly lower than 0.2 ERI, and that start-up costs of a cold standby unit are also equivalent to an ERI in the range of 0.2.

E. SDG&E

The hearings addressed the appropriate ERI methodology for utilization in Edison's ECAC proceedings, and thus concerned the ERI as it applies to Edison only. Nevertheless, SDG&E filed a post-hearing brief which essentially advocates that ERIs should have a ceiling of 1.0, but no floor. SDG&E argues generally against the concept of a floor, stating that an ERI floor implies that once the floor is reached, added resources have the same capacity no matter how high the utility's reserve margin. SDG&E further argues that an ERI should not be greater than 1.0, the cost of a CT. Without citing specific examples, SDG&E states that the market rate for capacity is generally lower than the cost of a CT, and that it is not aware of any market rate for capacity that is currently higher than that of a CT.

IV. Discussion

A. The "One/ Zero" Methodology Is Disapproved

In today's decision, we disapprove the use of Edison's "one/zero" methodology for use in calculating its ERI. No one in this proceeding, including Edison, advocates that we should continue to use this "one/zero" methodology in calculating Edison's ERI. However, the parties split as to whether the "one/zero" methodology has been approved by past Commission decisions. This split of opinion stems, in part, from the existence of two divergent lines of decisions. Since we disapprove the "one/zero" methodology today, we will set forth the two lines of decisions, and the reasons for our determination.

1. **The "Capacity Always Has Value" (Capacity Value) Line of Cases**

The capacity value line of cases commences with D.82-01-103 in the OIR 2 proceeding. In D.82-01-103, we stated that "[i]nsofar as an improved reserve margin always improves reliability at least to some degree, the capacity payment always has some positive value." (8 CPUC 2d 20, 64, 114.) Later, in D.82-12-120, we firmly rejected the first proposed ERI methodology (offered by PG&E) which advocated capping the ERI at 1.0:

> "[PG&E's] ERI method is biased because it allows for downward adjustments in the shortage cost proxy when reserve margins are above target levels, but does not allow for upward adjustments in years in which reserve margins are below target levels. We agree...that such upward adjustments should be a part of any precise shortage cost methodology. Clearly, as noted earlier, the combustion turbine is a proxy for the equilibrium or average shortage cost value. Annual shortage costs will vary above and below the equilibrium value, due to the 'lumpiness' of powerplant capacity additions. This circumstance is especially true in the case of shortage costs for the near term, a time frame in which unexpected demand increases cannot be met with new plant additions because of the lead time associated with new plant construction." (D.82-12-120, 10 CPUC 2d 553, 609.) (Emphasis added).

The following year, our order in PG&E's Test Year 1984 General Rate Case (D.83-12-068) contained the first adopted ERI adjustment. The ERI was set equal to 2.0 for the test year, dropped below 1.0 for several subsequent years, then converged on 1.0 (the theoretical long-term equilibrium value).

In Edison's Test Year 1985 and SDG&E's Test Year 1986 General Rate Cases, we were unable to approve the reliability adjustment mechanisms proposed. In D.84-12-068, after rejecting Public Staff Division's (PSD, DRA's predecessor) Reliability Adjustment Factor, we instructed PSD and Edison, "preferably in

cooperation with other electric utilities, to develop and present an improved capacity adjustment mechanism in subsequent proceedings based on an EUE reliability criterion." (D.84-12-068, 16 CPUC 2d 721, 864-866.) In D.85-12-108, we emphatically rejected a PSD proposal for a simplistic "one/zero" method.

> "For a number of reasons this approach is unacceptable...the one-zero approach to shortage adjustment is contrary to a number of Commission decisions, including our recent decision on long-run avoided cost calculations (D.85-07-022)." (20 CPUC 2d 115, 175.)

Our ideas on capacity evaluation gradually jelled in a series of decisions issued in 1986 in the consolidated Standard Offer proceeding (A.82-04-44, et al., the successor to OIR 2). In D.86-05-024, we voiced concern that "...consignment of the issue to general rate cases seems only to have obscured it...the methodology issue should be settled on an industry-wide basis." (D.86-05-024, 21 CPUC 2d 124, 131.) We tentatively concluded that "all of our precedents suggest use for the time being of the ERI methodology, with EUE-derived reliability targets, by all three utilities." (Id. at 134.)

Furthermore we noted that "Edison presented an EUE analysis in its testimony...although it chose to approximate the results with a linear relationship to reserve margin instead of using the results directly. The latter seems preferable." (Id. at 133-134.) (Emphasis added.) Thus, contrary to the assertions made by Edison in this proceeding, there is nothing in D.86-05-024 (or any other decision in this line of cases) which adopts the linear "one/zero" methodology.

Finally, in D.86-11-071, we definitively stated that EUE would form the basis of capacity valuation.[10] We then proceeded to describe the ERI as "a way of expressing whether the value of additional capacity on an electric utility system in a given year is the same as, or greater or less than, the utility's marginal capacity investment," and adopted a simple algebraic formula for computing it. (D.86-11-071, 22 CPUC 2d 311, 315.)[11]

In D.86-11-071, we held in abeyance approval of a method for choosing an appropriate EUE target, pending further elaboration by the utilities. Later, in D.88-03-079, we approved Edison's and SDG&E's target-setting methods, but specifically exempted PG&E from compliance with the EUE-based approach, because we found that PG&E's susceptibility to large fluctuations in hydroelectric conditions produced unstable results in the reliability model runs. We then asked the parties to comment on an interim floor/ceiling methodology for PG&E. (D.88-03-079, 27 CPUC 2d 559, 564-569, 588.)

In D.89-06-048, we adopted a modified version of our "floor/ceiling" proposal for setting PG&E's ERI. We reasoned that a ceiling and floor are properly viewed as elements of a quid pro quo, in which "potential 'underpayments' to QFs resulting from the ceiling are balanced by evenly distributed 'overpayments' [resulting from the floor] over time." (D.89-06-048, mimeo. at

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10 Our embrace of EUE was in preference to an earlier measure of system reliability, the loss-of-load probability (LOLP). We said, "LOLP in its usual form indicates the cumulative duration of outages over a given time span, but EUE indicates the severity of those outages...and is thus better suited to determining a level of tolerable risk." (D.86-11-071, 22 CPUC 2d 311, 323 n. 4.)

11 The formula expresses the ERI as the ratio of the mean EUE in a given year (normalized over the appropriate block of QF capacity) to the EUE in the "target year." The "target year" was mandated to "reflect a lean but smoothly operating system." (Id. at 314-318, 321, 323.)

9-10.) The ceiling and floor were respectively set at 1.0 and 0.4, with an exponential decline between these bounds.

Significantly, DRA proposed the "one/zero" ERI methodology be adopted for PG&E's ERI, and opposed the concept of a floor payment. We again stated that shortage costs could exceed the full cost of a combustion turbine. We found that "DRA's proposal to impose an ERI ceiling of 1.0 (without a floor above zero) would impose a downward bias to the ERI." (Id., Finding of Fact 9, mimeo. at 12.)

2. The "One/Zero" Line of Cases

The second, divergent line of decisions consists of Edison's Test Year 1988 General Rate Case (GRC) decision (D.87-12-066), and all three of its subsequent ECAC decisions.

The key decision is D.87-12-066, which approved an ERI for Edison for the first time. In so doing, we rejected PSD's proposal (carried over from the consolidated Standard Offer proceeding) to substitute a simpler target reserve margin calculation of the ERI for our adopted EUE-based approach. We approved Edison's approach (with several modifications to the underlying input assumptions) because it was rooted in EUE. As we stated in Finding of Fact 258, "[t]he ERI proposed by Edison...is consistent with our findings in D.86-07-004 and D.86-11-071." (D.87-12-066, 26 CPUC 2d 392, 509-512, 596.)

Although based on EUE, Edison's ERI calculation actually employed a "one/zero" linear approximation of the exponential EUE curve (i.e., the "one/zero" methodology). The linear approximation was proffered in the interest of computational feasibility, in order to avoid "complex and burdensome...contract administration." (A.86-12-047, Exhibit 78.) In D.87-12-066, the ERI adopted for Edison was 0.43.

The identical linear approximation method has been utilized in each subsequent Edison ECAC for forecast years 1989, 1990 and 1991. (D.88-09-031, 29 CPUC 2d 314, 322; D.90-01-048, 35

CPUC 2d 169, 187; D.90-12-067, mimeo. at 17-27.) This methodology resulted in an ERI of 0.43, 0.0 and 0.0, respectively.

3. Unravelling the Confusion

As noted in section IV.A.4 below, the "one/zero" methodology violates fundamental principles of capacity valuation. Yet, in D.87-12-066 (the cornerstone of the "one/zero" line of cases) we stated that Edison's ERI was consistent with capacity valuation decisions D.86-07-004 and D.86-11-071. Moreover, Finding of Fact 8 of D.88-03-079 (from the capacity valuation line) said that "Edison's variable capacity payments have been set in its current general rate case (Application 86-12-047), using the ERI method approved in today's decision." (D.88-03-079, 27 CPUC 2d 559, 583.)

However, a careful review of D.88-03-079 shows that this decision did nothing more than approve Edison's target-setting method. The decision did not authorize Edison to employ a linear "one/zero" approximation to the EUE curve. On the contrary, it reaffirmed the unbounded formula adopted in D.86-11-071. (D.88-03-079, 27 CPUC 2d 559-590.) Thus, the ERI method which has been used to set Edison's as-available capacity payments ever since the 1988 Test Year GRC decision is not the ERI method which we approved in D.88-03-079. The explanation for this fundamental inconsistency may be found in the history behind Edison's above-cited Exhibit 78 received in the 1988 Test Year GRC proceeding.

During the course of the consolidated Standard Offer proceeding (A.82-04-44, et al.), Edison urged its linear "one/zero" approach.[12] D.86-11-071 found that Figure 2, and not Figure 3, in

12 Exhibit 205 (February 1986), received prior to D.86-05-024 and D.86-07-004, proposed this methodology, as did Exhibit S-15 (September 1986), received prior to D.86-11-071.

Edison's brief[13] "correctly depicts how a given block of new capacity...should be valued using the ERI." (D.86-11-071, 22 CPUC 2d 311, 318.) (A copy of Figure 2 is reprinted in Appendix A of this decision.) As can be seen from the figure, the ERI is calculated directly from the EUE curve. Edison's proposed linear approximation was displayed in Figure 3 of the same brief. (A copy of Figure 3 is reprinted in Appendix B.) Unfortunately, D.86-11-071 did not specifically depict Figure 2.

Figure 3 is clearly the precursor to Edison's above-cited Test Year 1988 GRC Exhibit 78. Evidently determined to have the Commission approve its "one/zero" EUE approximation, Edison simply recast its preferred Figure 3 methodology from the consolidated Standard Offer proceeding as Exhibit 78 in the 1988 GRC. We in turn then adopted this methodology in that proceeding.

4. Reasons for Disapproval of the "One/Zero" Methodology

Our decisions from the capacity value line contain two fundamental capacity valuation principles central to today's decision. First, the capacity payment always has some positive value because an increased reserve margin improves reliability to some degree. Second, the annualized cost of a CT is an equilibrium point, not a ceiling.

These principles were never expressly rejected or considered in the "one/zero" line of cases. In D.87-12-066, the cornerstone of the "one/zero" line of cases, the issues were never squarely presented, because the ERI adopted for Edison in that decision was 0.43. Thus, initially, the "one/zero" methodology led to a reasonable (non-zero) result.

13 "Concurrent Brief of the Southern California Edison Company Regarding Reinstatement of Standard Offer No. 2," dated October 15, 1986.

However, Edison's "one/zero" methodology conflicts with these articulated principles. Edison's "one/zero" methodology does not recognize that capacity always has some value, since it can result in an ERI of zero. Nor does the "one/zero" methodology provide for a non-zero floor to insure that potential underpayments resulting from the ceiling of 1.0 are balanced by evenly distributed "overpayments" over time. We have expressly rejected the "one/zero" methodology for PG&E in D.89-06-048. Notwithstanding our use of the "one/zero" methodology in the past few Edison ECAC proceedings, we reject this methodology for determining Edison's ERI as it is in conflict with our earlier policy determinations as set forth above.

B. Edison's Interim ERI

1. Floor/Ceiling Approach

We adopt a floor/ceiling methodology to calculate Edison's ERI in today's decision. The ceiling price will be paid whenever Edison's projected reserve margin for the forecast year is equal to or less than the target reserve margin. The ERI will decline exponentially as the projected reserve margin increases above the target until it reaches the floor of 0.1. At or beyond that point, the ERI will be at the floor value set forth below. [14]

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14 The exponential curve will be expressed by the following equation, ERI = e**-0.5x, where x equals excess reserves, in percent above the target reserve margin. GRA/IEP advocate that we instead adopt PG&E's exponential curve, set forth in D.89-06-048 for Edison, arguing that the PG&E curve declines more slowly than the Edison curve. CLECA also supports a less steep curve. We note with some dissatisfaction that the Edison curve is extremely steep. Because of the limited scope of these proceedings, the record did not contain evidence of how PG&E's curve was determined, or evidence of any other, less steep curve. Thus, for this proceeding, we adopt the EUE curve offered and documented by Edison and supported by DRA.

A floor/ceiling methodology is necessary both to minimize risk to the ratepayers of the ERI exceeding the ceiling, and to ensure that potential underpayments to QFs resulting from the ceiling are balanced by evenly distributed overpayments over time. We are persuaded that an ERI ceiling will serve to eliminate the risks to ratepayers that the ERI could escalate over 1.0. However, as a balance to the ceiling, we also adopt an equalizing floor, to ensure that any underpayments to QFs which result from the placement of a ceiling are adjusted by a steady stream of payments to QFs in times when reserve margins exceed Edison's target. This floor/ceiling approach provides for assurances to the ratepayers that the ERI will never skyrocket, even in times of short reserve margin. The floor is established as a trade-off for the ceiling.

We therefore reject Edison's proposal for a methodology which consists of a ceiling but no floor.[15] As we stated in D.89-06-048, a proposal to impose an ERI ceiling, but no floor (or conversely a floor but no ceiling) suffers from the same conceptual flaws we outlined in D.82-12-120, namely, that the method is biased because it allows for downward adjustments when reserve margins are above target levels, but does not allow for upward adjustments in years in which reserve margins are below target levels.

We do not find persuasive Edison's position that the floor and ceiling are independent issues that should not be linked. Edison advocates that its ERI methodology should not contain a

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15 In addition to other arguments addressed below, Edison argues that a ceiling of 1.0 is necessary to insure the integrity of Iterative Cost-Effectiveness Method (ICEM) analysis, but a floor will "distort" such analysis in the BRPU. While a floor on the ERI may justify adding a resource slightly sooner than it would otherwise be needed, we do not believe that this is sufficient reason to justify the exclusion of a floor, particularly when Edison is receiving the benefit of a ceiling in the ICEM analysis.

floor, but its ERI should never exceed 1.0 (the cost of a CT) unless it can be shown that greater capacity costs would be a certainty.

Edison's argument sets forth an inappropriate standard because the ERI is set prospectively, and determined by looking at the overall probabilities that capacity may be required on a system, and thus, have reliability value. As explained by CLECA's witness, Dr. Barkovich,

> "The ERI is set prospectively. And it is set as a basis for payments in some future period. It is set based on anticipation of a number of probable circumstances that may occur that would result in Edison requiring capacity. It could be because of outages on units, it could be because the units simply wouldn't run because there was no fuel, it could be for unexpected excursions of demand above that forecast and planned for." (Tr. 29, 3039:5-13.)

Furthermore, although the testimony indicated that a CT can be added to a system "quickly," this process takes about three years. Therefore, a utility could have a difficult time arranging adequate capacity if, for example, it were to have a major plant failure. We have previously recognized that actual shortage costs vary above and below equilibrium (i.e., above and below 1.0) especially in the case of near-term shortage costs, which is during "a time frame in which unexpected demand increases cannot be met with new plant construction." (D.82-12-120, 10 CPUC 2d at 609.)

The record indicated instances where Edison's ERI could exceed 1.0, using Edison's own EUE curve. For instance, testimony indicated that if the San Onofre Nuclear Generating Station were shut down either as a result of a failure, an accident, or court action (for a reduction of about 2279 MW), Edison's ERI could be about 4.5 to over 5.0. Although Edison states that it has 1300 MW of standby reserve capacity that can be activated within three to five days, these reserves do not provide for immediate capacity.

Moreover, if it is necessary for these reserves to operate longer than several weeks, it would take one to two years for them to be activated.

Testimony also established that in 1989, Edison sent a letter to its QFs declaring a system emergency due to fuel supply curtailments and outages of generating units on the Edison system. The Edison letter called upon the QFs to deliver power to Edison. This occurred when Edison's reserve margin was 32.4%. In addition to underscoring the principle that capacity always has some value, this letter indicates that there may be instances in which additional capacity is needed on a system quickly, no matter what the reserve margin. The Edison letter refutes the argument that additional capacity in the short-term can never exceed the full cost of the CT.[16] Our prior decisions also belie Edison's argument that an ERI can never exceed 1.0. For example, in D.83-12-068, we set PG&E's ERI at 2.0.

We are not persuaded to the contrary by Edison's argument that the floor/ceiling methodology was established by us for PG&E only because PG&E is more dependent on hydroelectric power than is Edison. We did not adopt a true EUE-dependent ERI for PG&E because PG&E's susceptibility to large fluxuations in hydroelectric conditions produced unstable results in the EUE reliability models. However, while a utility's hydroelectric dependencies are one justification for a floor/ceiling approach, they are not the only

16 Edison argues that this letter has no relevance to this proceeding because the emergency conditions occurred in 1989 primarily because of a fuel shortage (although a plant was also down for refueling), and this fuel shortage is not likely to occur again. We believe this letter is relevant for the reasons set forth above. Moreover, assuming for the sake of argument that this particular emergency might never occur again, the letter nonetheless indicates that unanticipated emergencies may occur which would increase the need for capacity.

justification for such an approach. We also stated in D.89-06-048 that the primary purpose of a floor is as a quid pro quo for a ceiling, namely, "to insure that potential 'underpayments' to QFs resulting from the ceiling are balanced by evenly distributed 'overpayments' over time." (D.89-06-048, mimeo. 9-10.)

We also find GRA/IEP's primary proposal for establishing a proxy ERI based on the Edison/BPA contract unpersuasive because it fails to minimize ratepayer risks to the same extent as the floor/ceiling approach.

2. Ceiling of 1.0/Floor of 0.1

The establishment of a floor/ceiling approach to Edison's ERI does not end our inquiry today. We must establish values for both the floor and the ceiling.

An ERI of 1.0 represents an equilibrium value -- the cost of implementing a CT. All parties are in agreement (albeit for different reasons) that if a ceiling is utilized, it should be set at 1.0. We agree and therefore adopt a ceiling value of 1.0 for Edison's ERI.

Setting a floor value is more problematic. We have not enunciated to date any clear process for determining an ERI floor. While we do not approve GRA/IEP's primary proposal, for purposes of determining a floor in this proceeding, we adopt GRA/IEP's approach (also endorsed by CLECA) of evaluating transactions in which Edison has been involved to determine how Edison values capacity under different circumstances. These transactions must also be reviewed in light of the ERI principles set forth above, and in light of the nature of the EUE curve adopted for Edison.

After weighing and balancing these factors, we determine that it is reasonable to set the floor for Edison's interim ERI at 0.1. Testimony established that Edison contracted with SDG&E to sell excess capacity starting in 1993 at a price of $2 per kilowatt-month for the four summer months for an ERI of about 0.1. Although SDG&E, and not Edison, is the purchaser of this capacity,

this contract is nonetheless probative of a market value for capacity.

DRA argues in favor of an ERI floor of 0.2, since 0.2 is roughly equivalent with start-up costs of a cold standby unit, and is about the mid-range ERI in recent short term capacity purchases. Edison also presented testimony which showed that, under the Edison/BPA contract, it had an option to purchase spot capacity at a price equivalent to an ERI of 0.32.[17] The record also included evidence that Edison made a few capacity purchases during the second quarter of 1991 for an ERI equivalent of below 0.1, although Edison indicated that these purchases were made for economic, cost-effectiveness reasons.

We are setting an interim ERI for Edison. A floor is a necessary balance for a ceiling. CLECA opined that the likelihood of Edison's capacity availability in excess of the target reserve margin suggests that ERIs greater than 1.0 may not be likely. We believe it is reasonable to conclude that, at least in the interim, there is a probability of capacity availability in excess of the target reserve margin. Therefore, a floor in the lower end of values presented on the record provides a reasonable balance to a ceiling of 1.0. This approach also comports with our prior decisions that capacity always has value, and protects the ratepayers by minimizing risks of the ERI exceeding the ceiling, while at the same time providing for a reasonable floor value, given the current probabilities of capacity availability.

17 We have also considered but given less weight to the ERIs set forth in the documentation to the Edison/BPA contract, as this base contract (as opposed to the option purchase contract) is providing for capacity already embedded in Edison's system.

GRA/IEP urge us to adopt PG&E's floor of 0.4 for this proceeding, until the ERI issue for all three utilities can be more thoroughly addressed later in the BRPU. GRA/IEP argue that the 0.4 floor is conservative for Edison, because its curve is steeper than PG&E's.[18] We agree with GRA/IEP that Edison's EUE curve is steeper than PG&E's. As stated above, since the record did not indicate the origins of the PG&E curve, we are unable to effectively compare the PG&E curve to that of Edison. Therefore, we do not think this argument in and of itself justifies a floor of 0.4. Rather, on balance of the considerations set forth above, we believe that an ERI of 0.1 is a reasonable floor for determining Edison's interim ERI.[19]

Findings of Fact

1. The ERI is a number used to quantify the value of added capacity to an electric utility's system.

2. On July 2, 1991, we issued D.91-07-015, which addressed a Petition for Modification of our order in Edison's ECAC proceeding for forecast year 1991. The Petition for Modification alleged that we erred in the 1991 ECAC decision by setting the price paid by

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18 If Edison's reserves are one percent below the target, its formula yields an ERI of 1.6 (without a ceiling). If Edison's reserves are one percent above the target, the ERI drops to about 0.6. These figures indicate that the EUE curve sharply increases and decreases. Moreover, the ERI is asymmetric around the value of 1.0, as it exceeds the full value of the CT by more than it falls below it, when it falls plus or minus one percent from the target reserve margin. GRA/IEP argue that this asymmetry argues for a floor higher than that of PG&E.

19 At the point when QFs are able to make both short- and long-term sales into the market generally (see e.g. this Commission's transmission access investigation, I.90-09-050), we may wish to explore other alternative methods for determining an ERI, including but not limited to a market based approach, in lieu of an administrative approach such as the one currently used.

Edison to QFs for as available capacity as zero, based on the decision's adopted value of zero for Edison's ERI. We denied this Petition without prejudice, and invited the parties from the Edison ECAC proceeding to review Edison's ERI methodology in the BRPU.

3. Accordingly, on August 28 and 29, 1991, hearings were held in the BRPU regarding an appropriate ERI methodology for Edison. The matter was submitted after post-hearing briefing on September 16, 1991.

4. Two divergent lines of decisions exist regarding our determination of the ERI. In this decision, we have labeled these two decisional lines as the "capacity always has some value" (capacity value) line and the "one/zero" line.

5. The ERI adopted for Edison in D.87-12-066, the key decision in the "one/zero" line of decisions, was 0.43. The subsequent three Edison ECAC decisions adopted an ERI of 0.43, 0.0 and 0.0.

6. It takes about three years to add a combustion turbine to the utility's system.

7. A utility could have a difficult time arranging adequate capacity if, for example, it were to have a major plant failure.

8. The record indicated instances where Edison's ERI could exceed 1.0, using Edison's own EUE curve. Estimates of ERIs for Edison have thus ranged from over 1.0 to under 0.1 in this proceeding.

9. In 1989, Edison sent a letter to QFs declaring a system emergency, and called upon the QFs to deliver power to Edison. This occurred when Edison's reserve margin was 32.4%.

10. We have previously recognized that actual shortage costs vary above and below equilibrium (i.e., above and below 1.0) especially in the case of near-term shortage costs, which is during "a time frame in which unexpected demand increases cannot be met with new plant construction."

11. An ERI of 1.0 represents an equilibrium value -- the cost of a combustion turbine. All parties are in agreement (albeit for different reasons) that if a ceiling is utilized for Edison's ERI, it should be set at 1.0.

12. We have not enunciated to date any clear process for determining an ERI floor.

13. For purposes of determining a floor in this proceeding, we adopt an approach of evaluating transactions in which Edison has been involved to determine how Edison values capacity under different circumstances. These transactions are also reviewed in light of the capacity valuation principles and the nature of the EUE curve adopted for Edison.

Conclusions of Law

1. The capacity value line of decisions contains two fundamental capacity valuation principles central to today's decision. First, the capacity payment always has some positive value because an increased reserve margin improves reliability to some degree. Second, the annualized cost of a CT is an equilibrium point, not a ceiling.

2. The two fundamental capacity valuation principles central to today's decision were never expressly rejected or considered in the "one/zero" line of decisions.

3. The "one/zero" methodology was never approved in the capacity value line of decisions.

4. Since Edison's "one/zero" methodology conflicts with the two fundamental capacity valuation principles, we reject this methodology for determining Edison's ERI.

5. We adopt a floor/ceiling method for calculating Edison's ERI.

6. A floor/ceiling methodology is necessary both to minimize risk to the ratepayers of the ERI exceeding the ceiling, and to ensure that potential underpayments to qualifying facilities resulting from the ceiling are balanced by evenly distributed overpayments over time.

7. The ERI is set prospectively and is determined by looking at the overall probabilities that capacity may be required on a system, and thus, have reliability value.

8. It is reasonable to adopt a floor value of 0.1 and a ceiling value of 1.0 for Edison's ERI.

9. Until further action is taken by this Commission, this floor/ceiling methodology should be applied to our decisions in Edison's ECAC proceedings.

10. Because this decision is to be applied to this year's Edison ECAC proceeding, A.91-05-050, this order should be effective today.

INTERIM ORDER

IT IS ORDERED that the following Energy Reliability Index (ERI) floor/ceiling methodology will be used to calculate the ERI in our decisions in Southern California Edison Company's (Edison) Energy Cost Adjustment Clause (ECAC) proceedings until further order of this Commission:

a. The ERI will have a ceiling of 1.0 and a floor of 0.1.

b. The ceiling price will be paid whenever Edison's projected reserve margin for the forecast year is equal to or less than its target reserve margin.

c. The ERI will decline exponentially as the projected reserve margin increases above the target until it reaches the floor of 0.1. At or beyond that point, the ERI will be the floor of 0.1.

d. The ERI exponential decline will be computed by the following formula: e raised to the power (-0.5x), where x equals excess reserves, in percent above the target reserve margin, and e is the base of the natural system of logarithms, or approximately 2.7.

This order is effective today.

Dated November 20, 1991, at San Francisco, California.

PATRICIA M. ECKERT
President
DANIEL Wm. FESSLER
NORMAN D. SHUMWAY
Commissioners

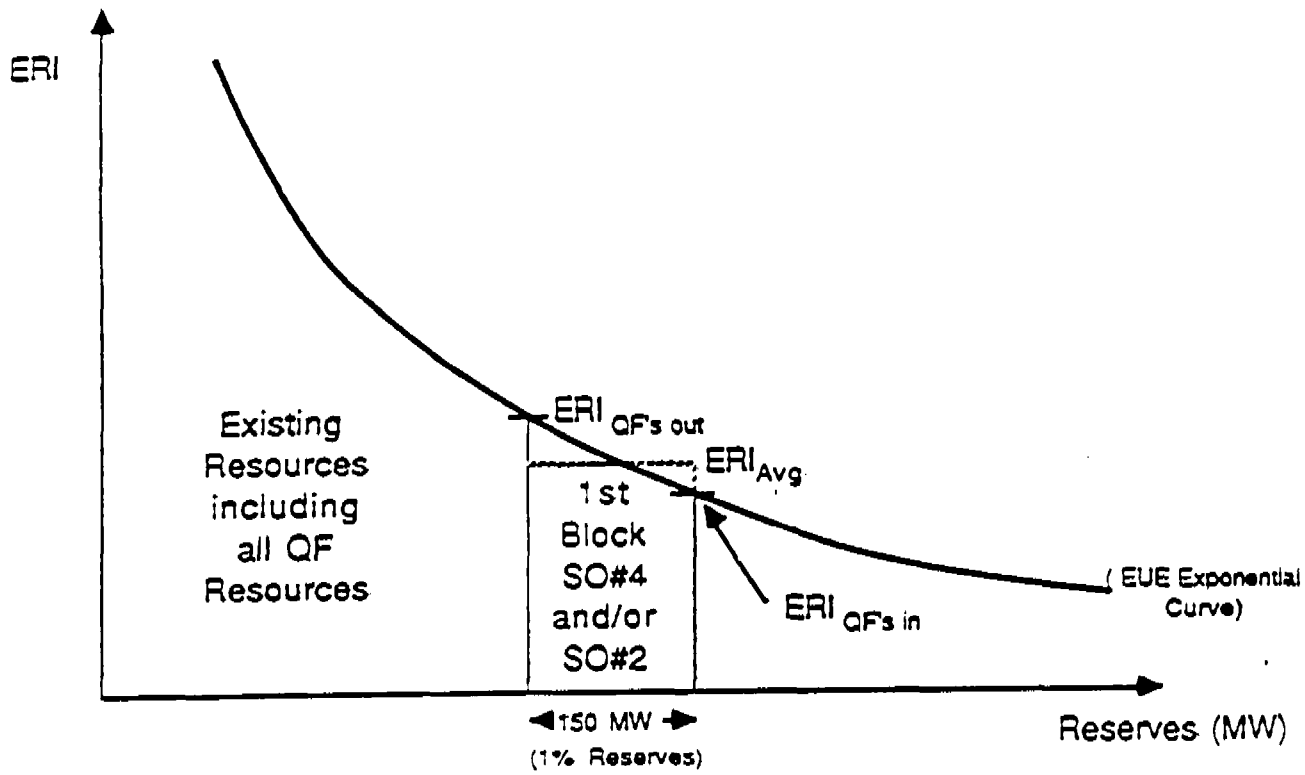
Commissioner John B. Ohanian, being necessarily absent, did not participate.

I CERTIFY THAT THIS DECISION WAS APPROVED BY THE ABOVE COMMISSIONERS TODAY

NEAL J. SHULMAN, Executive Director

Figure 2

GENERAL CAPACITY VALUATION METHODOLOGY



1. QF Capacity Value = CT(annual installed cost) X ERI_{Avg}

2. ERI = EUE/target EUE

3. $ERI_{Avg} = (ERI_{QFs\ in} + ERI_{QFs\ out})/2$

where ERI = Energy Reliability Index

EUE = Expected Unserved Energy

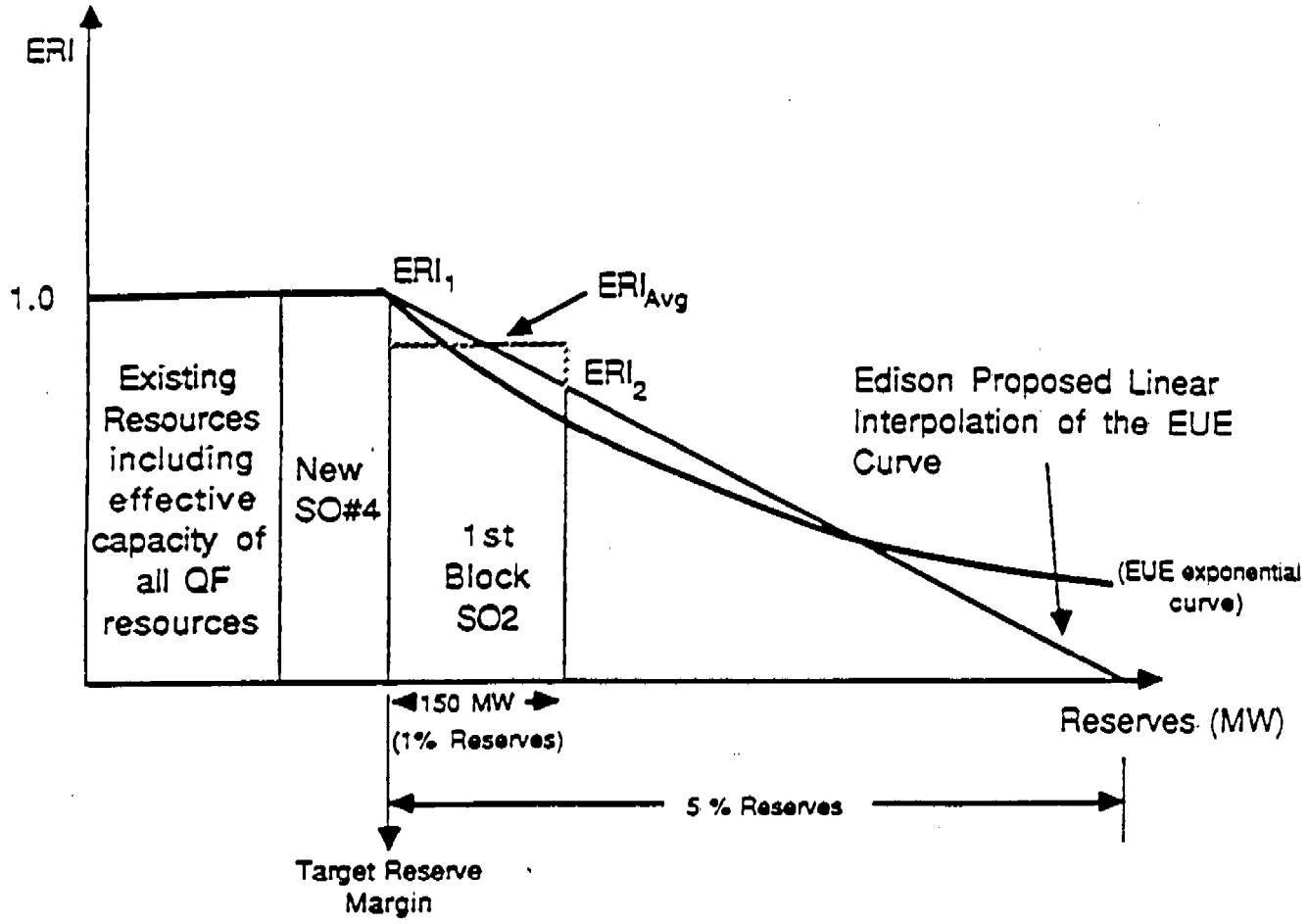
CT = Annual installed cost of a combustion turbine

• Based on Edison's understanding of D. 86-05-024 recommendations for developing an ERI

(END OF APPENDIX A)

Figure 3

EDISON'S PROPOSED CAPACITY VALUATION METHODOLOGY



1. QF Capacity Value = CT (annual installed cost) X ERI_{avg}
2. ERI = EUE/Target EUE
3. $ERI_{avg} = (ERI_1 + ERI_2)/2$

where ERI_{avg} is determined using a linear interpolation

- The target EUE is about 16 MWhrs
- ERI is always ≤1.0
- The EUE calculation resource planning assumptions include all existing resources, future committed and peaking resources (including 3rd A/C transmission line and expansion of Edison's peaking hydro resources), adverse hydro conditions, and no economy energy as firm capacity support.
- Based on Schoonyan, Ex S-15, pp. VII-19R to VII-21R, VII-37R, and VII-43R to VII-56R

(END OF APPENDIX B)