

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

I.D. # 12141
ALTERNATE RESOLUTION E-4569
June 27, 2013

REDACTED
RESOLUTION

Resolution E-4569. Southern California Edison Company (“SCE”) requests the Commission approve two Confirmations for Resource Adequacy Capacity Products that SCE executed with Calpine Energy Services, L.P. (“Calpine”).

PROPOSED OUTCOME: This Resolution rejects, in its current form, SCE’s Confirmation for Resource Adequacy (“RA”) Capacity Product, which is an Agreement for Combined Heat and Power Resource Adequacy Capacity Product for (1) 280.5 Megawatts (“MW”) of combined heat and power resource adequacy capacity associated with the Los Medanos Energy Center, LLC, (2) 120 MW of combined heat and power resource adequacy capacity associated with the Calpine Gilroy Cogen, L.P. The Resolution provides guidance to SCE for potential modifications to the Agreements which the Commission would approve in a subsequent Tier 1 Advice Letter filing, and provides additional guidance to SCE for Combined Heat and Power solicitations in the future.

SAFETY CONSIDERATIONS: The two agreements approved here are Confirmations for Resource Adequacy associated with the Los Medanos Energy Center and Calpine Gilroy Cogen facilities. The Commission’s jurisdiction extends only over SCE, not to either of the Calpine facilities. Based on the information before us, neither agreement appears to result in any adverse safety impacts on the facilities or operations of SCE.

ESTIMATED COST: None

By Advice Letter 2771-E filed on August 31, 2012.

SUMMARY

Southern California Edison’s (“SCE”) Confirmation for Resource

Adequacy (“RA”) Capacity Product, which is a capacity-only Power Purchase Agreement (“PPA”) with Calpine Energy Services, L.P. (“Calpine” or “Seller”) for 280.5 megawatts (“MWs”) of capacity associated with the Los Medanos Energy Center (“LMEC Agreement”) and for 120 MWs of capacity associated with the Calpine Gilroy Cogen, L.P. (“Gilroy”) is consistent with the requirements of the Combined Heat and Power Request for Offer (“CHP RFO”) competitive solicitation under the Qualifying Facility and Combined Heat and Power Program Settlement Agreement (“QF/CHP Settlement”).

However, the QF/CHP Settlement Agreement contains ambiguity that the Commission clarifies in this Resolution for subsequent CHP solicitations. For the second CHP RFO and any subsequent RFOs, the Commission clarifies that no RA-only bids shall be accepted.

For contracts signed as a result of the first CHP RFO, the Commission recognizes that a Commission clarification/interpretation of the QF/CHP Settlement requirements was not yet available, and therefore Calpine, and any other bidder, relied on the utilities’ acceptance of RA-only bids as eligible in the first solicitation. Thus, this Resolution acknowledges that a reasonable compromise is necessary to address RA-only contracts successful during the first solicitation.

This Resolution offers SCE several options for renegotiating the instant LMEC and Gilroy Agreements and resubmitting the contracts as Tier 1 Advice Letters for Commission approval, if it complies with one of several options discussed in this Resolution. The contract options available to SCE that the Commission would accept in Tier 1 Advice Letters are as follows:

- I. QF/CHP Agreements for RA-only capacity that match the level of energy output delivered to the LMEC and Gilroy steam hosts, but are otherwise identical to the instant LMEC and Gilroy Agreements.
- II. QF/CHP Agreements for RA-only capacity that match the level of baseload power output from the LMEC and Gilroy facilities but are otherwise identical to the instant LMEC and Gilroy Agreements.
- III. QF/CHP Agreements for RA-only capacity that are for one half or less of the contracted amount in the instant Agreements (up to no more than 140.25 MW associated with LMEC and 60 MW associated with Gilroy), but are otherwise identical to the instant LMEC and Gilroy Agreements.

BACKGROUND

On December 16, 2010, the Commission adopted the Qualifying Facility and Combined Heat and Power Program Settlement Agreement (“QF/CHP Settlement”) with the issuance of D.10-12-035. The Settlement resolves a number of longstanding issues regarding the contractual obligations and procurement options for facilities operating under legacy and new qualifying facility (“QF”) contracts.

The QF/CHP Settlement establishes Megawatt (“MW”) procurement targets and greenhouse gas (“GHG”) emissions reduction targets the investor-owned utilities are required to meet by entering into contracts with eligible CHP Facilities, as defined in the Settlement. Pursuant to D.10-12-035, the three large electric investor owned utilities (“IOUs”) must procure a minimum of 3,000 MW of CHP and reduce GHG emissions consistent with the California Air Resources Board (“CARB”) Scoping Plan, currently set at 4.8 million metric tonnes (“MMT”).

Among other things, D.10-12-035 updates methodologies and formulas for calculating the Short Run Avoided Cost (“SRAC”) energy price for QFs to be used in the Standard Contract for QFs with a Power Rating that is Less than or Equal to 20MW (the “QF Standard Offer Contract”), Transition PPAs, amendments to existing QF PPAs, and Optional As-Available PPAs. The SRAC methodology under the QF/CHP Settlement includes:

- (1) By January 1, 2015, transitioning SRAC pricing from a formula that is based in part on administratively-determined heat rates to a formula that solely uses market heat rates;
- (2) IOU-specific time-of-use (“TOU”) factors to be applied to energy prices to encourage energy deliveries during the times when the energy is most needed by customers;
- (3) A locational adjustment based on California Independent System Operator (“CAISO”) nodal prices; and,
- (4) Pricing options based on whether a cap-and-trade program or other form of GHG regulation is developed in California or nationally.

In addition, the Commission defined several procurement processes for the IOUs within the Settlement. Per Section 4.2.1, the Commission directs the three IOUs to conduct Requests For Offers exclusively for CHP resources (“CHP RFOs”) as a means of achieving the MW Targets and GHG Emissions Reduction Targets. The Settlement Term Sheet establishes terms and conditions regarding eligibility, contract length, pricing, evaluation and selection and other terms and conditions of the for the RFOs.

Per Section 5.1.4, the IOUs will conduct three CHP RFOs during the Initial Program Period scheduled at regular intervals, with the first initiated no later than 90 days of the Settlement Effective Date (November 23, 2011), or February 21, 2012. The three RFOs shall solicit CHP resources for an amount no less than the Net MW Target (the MW Target A, B, or C not otherwise procured by the Section 4 procurement processes) for each IOU.

SCE launched the 2011 CHP RFO for 630 MW on December 15, 2011. SCE decided to use a two track solicitation for the first RFO to manage the risk related to interconnection costs that would be borne by the IOUs and ratepayers. The First Track solicited Existing CHP Facilities, Utility Prescheduled Facilities (“UPFs”), Expanded Facilities, and New or Repowered CHP Facilities with an existing interconnection and a CAISO Phase I Interconnection Study. If the bidder had no such study completed the bidder permitted SCE to terminate the contract if network upgrade costs based on a future study exceeded a certain amount. The Second Track was for New or Repowered CHP Facilities where the bidder was unwilling to give SCE the termination right.

At the 2011 CHP RFO Bidders Conference, SCE outlined “Keys to a Successful Offer” including a preference for competitively-priced offers, optionality by varying the offer’s term length and providing curtailment provisions, a preference to execute Pro-Forma CHP or UPF Documents, and signs of project viability for new, expanded or repowered CHPs including progress toward interconnection.

In response, Calpine submitted offers for RA-only capacity from its LMEC and Gilroy facilities. Both Calpine offers were short listed by SCE, which then negotiated offer terms with Calpine. The resultant CHP agreements were

immaterially modified from the Pro-Forma RA Confirmation. On July 2, 2012, SCE executed the CHP agreements with Calpine's LMEC and Gilroy facilities and submitted Advice 2771-E for Commission approval.

NOTICE

Notice of AL 2771-E was made by publication in the Commission's Daily Calendar. Southern California Edison states that a copy of the Advice Letter was mailed and distributed in accordance with Section 3.14 of General Order 96-B.

PROTESTS

Advice Letter 2771-E was timely protested by the following parties: (1) Shell Energy North America (US), L.P. ("Shell Energy"), the Marin Energy Authority ("MEA"), and the Alliance for Retail Energy Markets ("AREM") jointly ("Joint Parties"); (2) Energy Producers and Users Coalition ("EPUC"); the Cogeneration Association of California; and (4) California Cogeneration Council ("CCC"), collectively ("Protesting Parties") on September 20, 2012. SCE filed a response to the protests of the Protesting Parties on September 27, 2012. Similarly, PG&E filed a response to the protests of the Protesting Parties on September 27, 2012, however, on October 12, 2012, PG&E submitted a letter to Energy Division requesting to withdraw its response specifically noting that General Order 96-B only allows the utility that filed an advice letter to respond to protests to that advice letter. We agree with PG&E's interpretation of GO-96B as it pertains to the opportunity to submit a response and therefore will not consider PG&E's response in this resolution. However, PG&E maintains the right to file comments on the draft resolution related to this advice letter.

(1) Shell Energy North America (US), L.P. ("Shell Energy"), the Marin Energy Authority ("MEA"), and the Alliance for Retail Energy Markets ("AREM") collectively ("Joint Parties")

The Joint Parties protested the LMEC and Gilroy Advice Letter for two reasons: (1) the QF/CHP Settlement Agreement does not contemplate or permit "capacity-only" contracts with CHP facilities; (2) SCE's proposed allocation of a portion of the Resource Adequacy ("RA") capacity (and associated RA capacity costs) from the LMEC and Gilroy Agreements to direct access ("DA") and community choice

aggregation (“CCA”) customers through the cost allocation mechanism (“CAM”) was not approved in D.10-12-035,¹ which adopted the QF/CHP Settlement.

(a) Joint Parties’ First Claim: the QF/CHP Settlement Agreement does not contemplate or permit “capacity-only” contracts with CHP facilities.

In their protest the Joint Parties stated that the QF/CHP Settlement did not contemplate or permit capacity-only contracts. The Joint Parties also stated that LMEC and Gilroy should not have been a part of SCE’s CHP RFO and instead should have bid into SCE’s all source solicitation, competing with other RA capacity-only products. In addition, the Joint Parties indicated that SCE revised its CHP RFO protocol to accept offers for capacity-only products, and that procurement of capacity-only product provides no CHP energy deliveries or GHG emissions reduction benefits. Due to the various reasons mentioned above, the Joint Parties requested the Commission to reject AL 2771-E.

In its response to the Protesting Parties, SCE stated that neither protesting party provided a basis for their claims regarding the reason for which RA-Contracts were not permitted in the Settlement nor were the reasons stated by the protestors in any way supported by the Settlement. SCE further stated that the Settlement itself did not preclude RA-Only Contracts and explained that both facilities met the eligibility requirements per the Settlement and therefore, are included within the scope of the settlement. Citing Term Sheet Section 4.2.1 at 12, SCE interprets the Settlement as not limiting of the types of CHP resources it may procure through its CHP RFO, including RA-only agreements. SCE also defended its revision of its CHP RFO and explained that there was nothing improper about SCE revising its CHP RFO protocol to accept offers for RA-only products.

We address the Joint Parties’ first claim in the “Discussion” section below.

¹ D.10-12-035, as modified by D. 11-03-051 and D.11-07-010.

(b) Joint Parties' Second Claim: CAM treatment cannot be afforded to a capacity-only contract

The Joint Parties stated that unless a contract includes costs for both energy and capacity-related products, a "net capacity cost" cannot be calculated and cannot be subject to the CAM to which CCAs and ESPs are subject. The Joint Parties claim that SCE may not use the CAM for allocating the cost of the LMEC and Gilroy Agreements because there is no way to determine if the capacity costs to be imposed under these contracts reflect a reasonable netting of energy and ancillary services.

We discuss the Joint Parties' second claim in the "Discussion" section below.

(2) Energy Producers and Users Coalition ("EPUC") and Cogeneration Association of California ("CAC")

In their separate protests, EPUC and CAC state that both Los Medanos and Gilroy RA Confirmations do not comport with the CPUC's QF/CHP Program Settlement standards for MW targets, and the terms of the confirmation letters do not conform to the terms of the Settlement for the following reasons:

- (a) RA Confirmation associated with these projects may not be properly accounted for as part of the 3,000 MW First Program Period target under the Settlement;
- (b) The Resource Adequacy Confirmations do not provide any obligation to provide energy nor ancillary services from Gilroy or Los Medanos, and do not provide the incentive or encouragement for CHP operation contemplated by the Settlement;
- (c) The Settlement contemplates the procurement from CHP generators that produce energy and provide RA capacity only as a collateral benefit, the case for LMEC and Gilroy facilities was not contemplated;
- (d) SCE should procure its RA needs through an RA only solicitation;
- (e) SCE did not consider the Los Medanos facility as an eligible resource under the Settlement, or potentially capable of providing power products consistent with the Settlement.

(3) California Cogeneration Council, jointly (“CCC”)

In its protest CCC did not object to SCE entering into an RA-only contract with Calpine, but argues that this procurement should not count toward the CHP Settlement’s MW Targets. CCC requested the Commission to hold that:

- (a) The Calpine Agreements do not count toward the CHP Settlement’s MW Target
- (b) RA-only products will not be eligible for future CHP RFOs and will not count against the MW Target established by the CHP Settlement.

(4) SCE Reply to Protests

SCE interpreted the protesting parties’ comments as implying that the term “CHP resources” does in fact include RA, but only if bundled with energy. According to SCE the bundling requirement makes no logical sense, and has no basis in the Settlement language. SCE argues that the definition of the phrase “CHP Resources” was broadly defined in the Settlement and was not specifically worded to exclude RA-only contracts. In addition SCE states that the Net Capacity Costs can be calculated for RA-only contracts, and accordingly should be allocated to non-IOU Load Serving entities.

Due to the similarity of the protests filed by the CAC/EPUC, SCE referenced the two protests together in its reply comments filing. Since some of the questions and statements issued by the CAC/EPUC were already summarized in the section above, this section will only cover new ideas introduced by the CAC/EPUC.

Recognizing that capacity only products could be procured elsewhere, SCE asserted that the availability of other procurement avenues does not preclude procurement through the CHP RFO. While SCE agrees with the CCC regarding the CHP Programs’ intent of creating a venue for viable contracting opportunities for existing and new CHP generating facilities, SCE claims that this intent does not provide a valid reason as to prohibit RA-only projects from

bidding into the SCE CHP RFO. In its application filed at the Federal Energy Regulatory Commission (“FERC”) pursuant to Section 210(m) of PURPA (“Section 210(m) application”),² SCE listed QFs with which it had a contract. At the time that SCE filed its Section 210(m) application, SCE did not have a contract with LMEC, and thus LMEC would not be included in this list, even though it is a “CHP resource.” SCE explained that given that LMEC is not located in SCE’s service territory, SCE was not under any obligation to include LMEC in its application. Furthermore, through its competitive solicitation SCE found that the price for both the LMEC and Gilroy facilities were cost-competitive and that both projects provided lower costs to the electric ratepayer in meeting the Settlement MW targets. SCE argues that the MWs associated with the RA only agreements should be counted since both facilities are eligible per the Settlement eligibility requirements, won SCE’s competitive CHP solicitation, and provide the most ratepayer benefits at the least cost.

We discuss the EPUC/CAC’s and CCC’s claims in the “Discussion” section below

DISCUSSION

On August 31, 2012, SCE filed Advice Letter AL 2771-E requesting Commission approval of the Confirmation of Resource Adequacy Capacity Product, which is a capacity-only agreement for 280.5 MWs of capacity associated with the Los Medanos Energy Center and 120 MWs of capacity associated with the Gilroy facility.

Specifically, SCE requests from the Commission:

1. Approval of the Confirmations in their entirety;

² SCE, along with Pacific Gas and Electric Company and San Diego Gas & Electric Company, was required by the terms of the QF/CHP Settlement to file at FERC the Section 210(m) application pursuant to Section 292.310 of the FERC’s regulations in order to terminate the mandatory purchase obligation under PURPA.

2. A finding that the Confirmations, and SCE's entry into the Confirmations, are reasonable and prudent for all purposes, subject only to further review with respect to the reasonableness of SCE's administration of the Confirmations;
3. A finding that the 280.5 MW associated with the LMEC Confirmation and the 130 MW associated with the Gilroy Confirmation apply toward SCE's procurement target of 1,402 MW of CHP capacity in the Initial Program Period, as established by the QF/CHP Program;
4. A finding that the Confirmations are neutral toward the GHG Target as they are for Existing CHP Facilities without a change in operations; and
5. Any other and further relief as the Commission finds just and reasonable.

Energy Division evaluated the LMEC and Gilroy agreements based on the following criteria:

- Consistency with D.10-12-035 which approved the QF/CHP Settlement including:
 - Consistency with CHP RFOs, eligibility requirements
 - Consistency with MW accounting
 - Consistency with GHG accounting
 - Consistency with cost recovery requirements
- The need for LMEC and Gilroy's procurement
- Cost reasonableness
- Public Safety
- Project viability
- Consistency with the Emissions Performance Standard
- Consistency with D.02-08-071, which requires Procurement Review Group (PRG) participation
- Consistency with D.07-12-052, which requires Cost Allocation Mechanism group participation

In considering these factors, Energy Division also considers the analysis and recommendations of an Independent Evaluator, if available.³ In this case, we have reviewed and weighed the conclusions from the IE report in determining the outcome of this resolution.

Consistency with D.10-12-035 which approved the QF/CHP Program Settlement

On December 16, 2010, the Commission adopted the QF/CHP Settlement with the issuance of D.10-12-035. The Settlement resolves a number of longstanding issues regarding the contractual obligations and procurement options for facilities operating under legacy and new QF contracts. Among other things, it establishes methodologies and formulas for calculating SRAC to be used in new QF Standard Offer contracts. Furthermore, the Settlement allows for bilaterally negotiated contracts with QFs to determine alternative energy and capacity payments mutually agreeable by relevant parties and subject to CPUC approval. Finally, the Settlement establishes a MW and GHG target for the IOUs. The IOUs must procure 3,000 MW of CHP and 4.8 MMT of greenhouse gas emission reductions in proportion to the load of the IOU and non-IOU Load Serving Entities. The QF/CHP Settlement became effective on November 23, 2011. In evaluating the consistency of the LMEC and Gilroy agreements, we have considered consistency with the CHP RFO eligibility requirements, MW accounting, GHG accounting and cost recovery.

³ Per Settlement Term Sheet 4.3.2: "Use of an IE shall be required for any negotiations between an IOU and its affiliate and may be used, at the election of either the buyer or the Seller, in other negotiations."

Consistency with CHP Requests for Offers (CHP RFOs) - Capacity-Only Agreements

Per Section 4.2 of the Settlement Term Sheet, the IOUs are directed to conduct Requests for Offers for CHP resources as a means of achieving their respective MW and GHG Emissions Reduction Targets. Per Section 4.2.2, CHP facilities with a nameplate Power Rating of greater than 5 MW may bid into the CHP RFO. In addition, the CHP facility must meet the State and Federal definitions⁴ for cogeneration and the Emissions Performance Standard.

Under Section 4.2.2.1 of the QF/CHP Settlement Term Sheet, the LMEC and Gilroy facilities both qualify to participate in the CHP RFO. Specifically: with an operating capacity of 561 MW for LMEC and 120 MW for Gilroy both facilities exceed the 5 MW threshold; both facilities satisfy the definition of “CHP Facility” in their respective agreements; both facilities are certified as Qualifying Facilities with the FERC.

As a condition of either facility’s agreement, Calpine states that LMEC and Gilroy are CHP Facilities, as defined in the QF/CHP Settlement, as of the agreement’s Effective Date; both agreements also provide that if LMEC or Gilroy are unable to maintain Qualifying Cogeneration Facility status, because either facility lost its steam host, SCE will have the option to terminate that agreement at that time.

As eligible QF CHP resources per Section 4.2.2 of the Term Sheet, LMEC and Gilroy successfully bid into SCE’s CHP RFO as qualifying CHP facilities, were shortlisted and selected as successful bids in SCE’s competitive CHP solicitation. For these reasons, we find both the LMEC agreement and the Gilroy agreement consistent with the Settlement’s eligibility requirements, allowing LMEC and Gilroy to participate in the utility’s CHP requests for offers.

⁴ State definition of cogeneration per Public Utilities Code Section 216.6. Federal definition of qualifying cogeneration per 18 C.F.R. §292.205 implementing PURPA.

Protesting Parties' Protests

Among other things, in their protest, the Protesting Parties raise a number of arguments for why RA-only contracts are ineligible under the QF/CHP Settlement and why the MWs associate with either project should not be counted towards SCE's Settlement MW Targets. Here we address the three protests as they relate to this issue jointly. Each of the arguments identified by the Protesting Parties has been identified below along with a staff response.

Issue #1: The Settlement does not expressly indicate that capacity-only contracts are allowed. Capacity only contracts should not be considered under the Settlement because this type of contract was never anticipated.

The Joint Parties are correct that capacity-only contracts were not expressly called for under the terms of the Settlement Agreement. They also were not expressly prohibited. Therefore, there is an ambiguity in the Settlement Agreement that is open to interpretation by the Commission.

Due to this ambiguity, we take this opportunity to clarify our interpretation of the Settlement Agreement as it applies to future RFOs conducted for CHP. We will then turn to the consequences of this interpretation for contracts that emerged from the first RFO, such as the instant LMEC and Gilroy contracts at issue in this Resolution.

Going forward, we clarify that we will reject any solicitations and contracts that are brought forward as capacity-only in the context of the QF/CHP Program. The reasons for this are multi-faceted. The most important reason is that a Resource Adequacy program already exists for capacity-only resources seeking revenues from utilities. The purpose of the RA program is to provide available capacity to utilities for reliability purposes.

The purpose of the QF/CHP program is altogether different. The QF/CHP settlement was designed to provide opportunities to CHP facilities whose primary, if not exclusive, purpose is to provide energy and heat to a host industrial facility, while also remaining interconnected to the grid and available to provide some benefits to the utilities.

Previous to the QF/CHP Settlement Agreement, CHP facilities in California relied on a must-take obligation on the part of the utilities under the terms of Federal Law (PURPA). In the context of the Settlement Agreement, those CHP parties agreed to remove the must-take obligation voluntarily in return for certain opportunities to bid in CHP-only RFOs. The CHP-only RFOs were intended to be an opportunity for like CHP resources to compete. The majority of CHP facilities may have some marginal flexibility to offer RA-only or ancillary services products to the grid, but the majority of their capacity and energy is devoted to their industrial host. Clearly, there are some exceptions to this, such as the Calpine facility at issue in this resolution, but it is not the majority of CHP facilities that have the ability to provide the majority of their capacity as RA-only. Thus, the Commission wishes to target the CHP RFOs to be designed to work for the majority of CHP facilities for which the Settlement Agreement was intended to meet their needs to cover their steam hosts while also providing some electricity to the grid.

In addition to this basic policy reasoning, the Commission also finds that the Settlement Agreement did already explicitly contemplate some type of option for RA-only contracts that might result from the CHP solicitations. The Settlement Agreement defines Utility Pre-Scheduled Facilities (UPFs) and identifies a specific set-aside of MW that would be eligible to be used by such capacity-only resources. This specific set-aside, together with the overall purpose of the Settlement Agreement, convinces us to resolve the ambiguity in the Settlement Agreement in favor of denying the opportunity for capacity-only contracts that are not UPFs, going forward.

It would have been preferable for the Commission to have identified and ruled explicitly on eligibility of capacity-only contracts prior to the completion of the first RFO. In general, we are reluctant to modify terms of competitive solicitations after they have been completed. We value certainty in commercial transactions and regret the situation we now find ourselves in.

However, given the size of this contract (and several others currently before us) relative to the 3,000 MW capacity target that the utilities are required to procure during the first three RFOs, we cannot allow this Settlement Agreement ambiguity to eviscerate the contractual opportunities for so many other potential CHP facilities during this time period, in favor of approving such a large contract here in this Resolution.

To mitigate this situation, we offer SCE the following guidance for compromise options that we would accept and approve. Should SCE and Calpine choose one of these options, SCE is required to submit a revised Agreement within 30 days of the adoption of this Resolution as a Tier 1 Advice Letter.

Option 1

SCE and Calpine may restructure the Agreements for RA-only capacity that matches the level of energy output delivered to the LMEC and Gilroy steam hosts. This would reduce the number of MW to be commensurate with the level of thermally-matched CHP, but would otherwise be identical to the instant LMEC and Gilroy Agreements.

Option 2

SCE and Calpine may restructure the Agreements for RA-only capacity that matches the level of baseload power output from the LMEC and Gilroy facilities. This would reduce the number of MWs to be commensurate with the level of baseload power output typical for the facilities, but would otherwise be identical to the instant LMEC and Gilroy Agreements.

Option 3

SCE and Calpine may restructure the Agreements for RA-only capacity that is for one half or less of the contracted amount in the instant Agreement (up to no more than 140.25 MW for LMEC and 60 MW for Gilroy). This would also reduce the number of MWs, but would otherwise be identical to the instant LMEC and Gilroy Agreements.

In the case of the three options above, the terms of the amended or renegotiated Agreements would be identical to the instant LMEC and Gilroy Agreements, except for the amount of MWs procured. Therefore, we make additional findings in this Resolution that would apply to those Options, should SCE and Calpine choose to exercise one of them, and bring back an amended Agreement for our consideration.

We reject the current form of the LMEC and Gilroy Agreements in this Resolution. We also prohibit RA-only solicitations and contracts as part of the QF/CHP RFOs in future solicitations, including SCE's subsequent RFOs.

Issue #2: As a capacity-only contract, the projects do not provide any GHG benefits and so are inconsistent with the Settlement given the GHG reduction targets the IOUs are required to meet.

Joint Parties are correct that the Settlement includes both MW and GHG targets, however the fact that a given contract does not contribute toward the GHG goals does not render a project ineligible to participate in, or inconsistent with the Settlement. The Settlement specifically includes projects that do not contribute toward the GHG targets because one of the goals is to ensure the continued operation of existing CHP facilities. Section 7.3.3 of the QF/CHP Settlement Term Sheet enumerates the project types/circumstances whereby a given project is treated as neutral for GHG accounting purposes under the Settlement. The underlying facility in the instant case would be treated as neutral for GHG accounting purposes as an existing CHP facility with no change in operations, pursuant to Section 7.3.3.1 of the Term Sheet, irrespective of whether the contract included the sale of energy and/or ancillary services. In other words, even if the contract included sale of energy or ancillary services, it would have been neutral for purposes of GHG accounting under the Settlement.

While IOUs are required to procure GHG reductions as part of the QF/CHP Settlement Agreement, not all contracts must deliver GHG benefits to be eligible for approval.

Issue #3: SCE should procure its RA needs through an RA only solicitation.

For contracts signed as a result of the first CHP RFO, the Commission recognizes that a Commission clarification/interpretation of the QF/CHP Settlement requirements was not yet available, and therefore Calpine, and any other bidder, relied on the utilities' acceptance of RA-only bids as eligible in the first solicitation. Thus, this Resolution acknowledges that a reasonable compromise is necessary to address RA-only contracts successful during the first solicitation.

This Resolution offers SCE several options for renegotiating the instant LMEC and Gilroy Agreements and resubmitting the contracts as Tier 1 Advice Letters for Commission approval, if it complies with one of several options discussed above in this Resolution.

Consistency with MW accounting - Capacity-Only Agreements

Issue #4: RA Confirmation associated with these projects may not be properly accounted for as part of the 3,000 MW First Program Period target under the Settlement.

Per Section 5.2.3.2 of the Term Sheet, the MW accounting for CHP PPAs executed with QFs who formerly sold to the IOUs and were never listed in any QF Semi-Annual Report will be based on the contract nameplate in the most recent QF or CHP agreements. On October 12, 2006, PG&E and Calpine executed a previous RA Confirmation Agreement for LMEC listing the contract quantity, though not the contract nameplate, as 561 MW. Pursuant to this 2006 Confirmation Agreement, Calpine formerly sold a Resource Adequacy Capacity Product to PG&E between 2008-2011. While LMEC's gross nameplate is 620.3 MW, the maximum operating capacity, or "PMax," is 561 MW. LMEC's Reportable Capacity, based on the facility's maximum operating capacity, is 561 MW. Since SCE is only purchasing 50% of the facility's capacity in the instant agreement, 280.5 MW (i.e., $.5 \times 561 \text{ MW} = 280.5 \text{ MW}$) of this CHP-eligible facility would have counted toward SCE's MW Target.

Similarly, Gilroy formerly sold to PG&E and was listed in PG&E's July 2002 Cogeneration and Small Power Production Semi-Annual Report with an operating size of 130 MW. Per the Term Sheet Section 5.2.3.2, 100% of this 130 MW amount would have counted toward SCE's MW Target under the Settlement even though 120 MW would have been contracted with the Gilroy facility.

After reviewing SCE's LMEC and Gilroy entry into the QF/CHP reporting template, staff determined that the MW accounting for the two Calpine facilities is consistent with the MW accounting methodology set forth by the Settlement. Accordingly, the Confirmations contribute 410.5 MW (130 MW + 280.5 MW) toward SCE's MW Target.

If SCE and Calpine negotiate revised Agreements for the purchase of half or less of the MW of the current Agreements and resubmit the contracts as a Tier 1 Advice Letters, pursuant to the QF/CHP Settlement Term Sheet Section 5.2.3.2, the contracted MW from the LMEC and Gilroy facilities shall count toward SCE's CHP MW targets.

Consistency with Greenhouse Gas accounting - Capacity-Only Agreements

As noted above, Section 7.3.3.1 of the Settlement Term Sheet states: "Existing CHP Facility with no change in operations: Regardless of contract status (i.e., a new agreements with an Existing CHP Facility or one that sells to the market) the CHP Facility is considered neutral for GHG accounting purposes."

SCE's entry into the QF/CHP reporting template calculated LMEC's and Gilroy's respective GHG contributions and since both projects are Existing CHP Facilities under the Term Sheet, with no change in operations, the two agreements have no impact, positive or negative, on SCE's progress toward its GHG Targets under the Settlement. Therefore, both projects will be counted as "GHG neutral" CHP facilities for SCE's GHG accounting purposes under the Settlement.

Both the LMEC and Gilroy contracts do not contribute to SCE's GHG Emissions Reduction Targets because both facilities are existing CHP facilities with no change in operations, which, under the Settlement, is counted as GHG neutral.

Consistency with cost recovery requirements

Issue #5: CAM treatment, involving the allocation of Net Capacity Costs, cannot be applied to an RA only contract because these contracts offer no energy or ancillary service value.

The fact that the energy value and ancillary service value under the contract are equal to zero does not mean the net capacity cost cannot be calculated. Rather it simply means the net capacity cost equals the contract cost. Pursuant to the QF/CHP Settlement, the net capacity costs of this contract should be allocated pursuant to the cost allocation rules defined in Section 13.1.1 of the QF/CHP Settlement Term Sheet.

This argument seems to suggest that the ability to calculate a “net” value requires that any elements that are being netted out to have non-zero values. This argument appears to fly in the face of basic algebra. In the case of the Net Capacity Cost calculation, Section 13.1.2.2 of the Term Sheet states, “The net capacity costs of the CHP program shall be defined as the total costs paid by the IOU under the CHP program less the value of the energy and any ancillary services supplied to the IOU under the CHP program”. Mathematically, this would be represented as follows:

$$\text{NCC} = \text{TCC} - \text{E} - \text{AS}$$

Where:

NCC = Net Capacity Cost

TCC = Total Contract Cost

E = Energy Value

AS = Ancillary Service Value

If the Energy Value and the Ancillary Service Value are both equal to zero, this equation resolves to:

$$\text{NCC} = \text{TCC}$$

In other words, the Net Capacity Cost can be calculated, it just happens to be equal to the Total Contract Cost in this instance. Thus, CAM treatment may be applied to capacity-only CHP contracts.

The CHP settlement specifies that when facilities are contracted via non-RPS contracting vehicles available in the settlement, the costs and benefits of those contracts are to be allocated to all benefitting customers. This in general refers to the Cost Allocation Mechanism (CAM) process that the Commission uses when contracting for system capacity that will help overall system reliability.

Need for Procurement

Per the Settlement Term Sheet Section 5.1.2, SCE's MW procurement goal for Target A is 630 MW. As of SCE's October, 2012 CHP Semi-Annual Report filing, SCE has procured 847 MW⁵ and 0.1 MMTCO₂e of GHG Reductions towards its targets. While SCE will be over-procured by 217 MW beyond its Target A goal of 630 MW, after reviewing the bids in SCE's CHP RFO, staff recognizes that while there is no immediate need to procure either Calpine project for SCE's Target A goals, given the overarching 1,402 MW target for SCE the procurement of LMEC and Gilroy can be justified as reasonable. In addition, without the LMEC and Gilroy projects, SCE would not be able to meet its Target A MW goals. Importantly, nothing precludes the IOUs from exceeding their *Target A capacity amounts and there may be strategic value in procuring in excess* in the initial RFO to the extent lower cost projects are available.

The procurement of the MWs associated with either project can be justified per the Settlement Term Sheet section 4 as SCE is required to procure at least 630 MWs for its Target A MW Goals.

Cost reasonableness

Although both facilities have sold to PG&E previously, and while Gilroy was listed in PG&E's July 2002 Cogeneration report, LMEC was not listed in any of the Cogeneration and Small Power Production Semi-Annual Reports of the three IOUs. In the confidential appendix below staff has reviewed all the bids that SCE received in its first CHP RFO and found both Agreements to be cost reasonable.

Similarly the IE concludes that the evaluation methodology used to evaluate the cost and benefits of the two Calpine agreements are reasonable for this type of analysis and effectively evaluates offers with different products, terms, and contract structures. The IE found no evidence of bias in the evaluation methodology as a result of review of the model operation.

⁵ The 847 MWs of CHP includes non-CPUC approved contacts, since the Settlement Term Sheet Section 8.2.2 states that the reporting template includes all executed contacts with the IOU.

As discussed in detail in the confidential appendix, when compared to other bids in SCE's CHP RFO, both agreements are reasonable and rank amongst the highest value bids that were submitted.

SCE's bid evaluation methodology uses a two stage approach. The first stage evaluates Indicative Offers almost exclusively by the net present value of their costs and benefits and their contribution to the Settlement MW Target. Inputs to calculate \$NPV/MW include:

$$\frac{\text{Net Present Value of Benefits}}{\text{Net Present Value of Costs}}, \text{ where:}$$

Benefits include:

- Capacity benefits based on monthly firm capacity offered according to CPUC Resource Adequacy accounting, pursuant to CPUC and CAISO rules for dispatchable and non-dispatchable facilities;
- Energy benefits based on the forecasted market and locational value of energy; Ancillary Service and Real-Time flexibility benefits for dispatchable facilities based on a production simulation
- Credit/Collateral values based on providing performance assurance per Term Sheet Section 4.2.8

Costs include:

- + Capacity charges; Variable O&M charges; Energy Payments; Other costs
- + Seller and/or Buyer responsibility of GHG Compliance Cost per Term Sheet Sections 4.2.7.2 – 4.2.7.3
- + Annual Transmission system upgrade costs for new, expanded, or repowered facilities based on a CAISO Phase I Interconnection Study
- + Debt Equivalence indirect costs estimated to be incurred as a debt-like obligation by executing long-term PPAs

To determine whether offer prices were excessive to alternatives, SCE developed long-term forecasts of RA capacity, natural gas, electricity, and GHG costs per Term Sheet Section 5.4.1.

The quantification of \$NPV/MW is used in order to minimize cost while choosing projects that fulfill the MW Target, which SCE considered to be a procurement need. As required by Section 4.2.5.7 of the Settlement Term Sheet,

SCE used this measure as an analysis of market value for the Offers. \$NPV/MW was the primary metric used in determining the Short List. Once notifying the Short Listed bidders of their status, SCE began negotiations with the counterparties.

If SCE and Calpine renegotiate the Agreements according to one of the options described above and the per-MW capacity costs do not change, the costs of the Agreement will be deemed reasonable.

Public Safety

California Public Utilities Code Section 451 requires that every public utility maintain adequate, efficient, just, and reasonable service, instrumentalities, equipment and facilities to ensure the safety, health, and comfort of the public.

The two agreements approved here are Confirmations for Resource Adequacy between SCE and the Los Medanos Energy Center and Calpine Gilroy Cogen. The Commission's jurisdiction extends only over SCE, not the Los Medanos Energy Center or Calpine Gilroy Cogen. Based on the information before us, neither of the two agreements appears to result in any adverse safety impacts on the facilities or operations of SCE.

Project Viability

Los Medanos Energy Center is an existing qualifying facility and has operated since 2001 and is interconnected to the CAISO-controlled grid at the transmission level. As an existing QF, the project faces minimal to no project development risk. According to SCE, no project development is expected or planned since LMEC is an existing facility.

Similarly, Calpine's Gilroy facility is an existing qualifying facility and has operated since 1988 and is interconnected to the CAISO-controlled grid at the transmission level. As an existing QF, the project faces minimal to no project development risk. According to SCE, no project development is expected or planned since Gilroy is an existing facility.

A detailed historical generation profiles for both facilities are described in detail in the confidential appendix of resolution.

Both Gilroy and the Los Medanos Energy Center are existing CHP facilities with proven histories of performance and therefore are viable projects.

Consistency with the Emissions Performance Standard

California Public Utilities Code Sections 8340 and 8341, enacted by Senate Bill 1368 (2007), require that the Commission consider emissions costs associated with new long-term (five years or greater) power contracts for base load generation on behalf of California ratepayers. D.07-01-039 adopted an interim Emissions Performance Standard (“EPS”) that establishes an emission rate for obligated facilities to levels no greater than the greenhouse gas emissions of a combined-cycle gas turbine power plant.

Pursuant to Sections 4.10.4.1 of the CHP Program Settlement Term Sheet, PPAs greater than five years that are submitted to the CPUC in a Tier 2 or Tier 3 advice letter must be in compliance with the EPS. The EPS applies to all energy contracts that are at least five years in duration for baseload generation, which is defined as a power plant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60 percent.

In D.07-01-039, the Commission adopted a GHG EPS which is applicable to a contract for base load generation, as established by SB 1368 and defined in D.07-01-039, having a delivery term of five years or more. All combined-cycle natural gas power plants that were in operation as of June 30, 2007 are deemed to be in compliance with the EPS.⁶ The LMEC facility is “deemed to be in compliance” with the EPS per D.07-01-039 Finding of Fact 16, as it is a combined-cycle natural gas facilities which has been in operation prior to June 30, 2007. Furthermore, Gilroy is not subject to the EPS since it is not “baseload generation” and therefore is not a “covered procurement” under D.07-01-039.

Pursuant to Public Utilities Code §8341 and D.07-01-039, a) the LMEC and facility is a combined-cycle natural gas facility that was in operation prior to June 30, 2007 and is therefore “deemed to be in compliance” with the Emissions Performance Standard and b) the Gilroy facility is not baseload generation and is

⁶ D.07-01-039, pp. 4-5.

therefore not “covered procurement” under D.07-01-039 and is exempt from the EPS.

Consistent with D.02-08-071 and D.07-12-052, SCE’s Procurement Review Group (“PRG”) and Cost Allocation Mechanism (“CAM”) group were notified of the Capacity-Only Agreement.

SCE’s PRG consists of representatives from: certain non-market participants, including the Commission’s Energy and Legal Divisions, the Division of Ratepayer Advocates, The Utility Reform Network, California Utility Employees, the Union of Concerned Scientists, and the California Department of Water Resources. SCE’s CAM group includes PRG participants as well as certain other non-wholesale market participant representatives of bundled service, direct access and community choice aggregator customers. SCE consulted with its PRG and CAM group regarding this transaction.

SCE consulted with its PRG regarding the launch of SCE’s 2011 CHP RFO on December 7, 2011. The SCE PRG members were also invited to attend SCE’s 2011 CHP RFO Offeror’s Conference which was held on January 13, 2012. SCE consulted with its PRG and CAM advisory groups regarding this transaction on four conference calls regarding SCE’s 2011 CHP RFO: (1) On February 8, 2012, SCE presented its RFO launch presentation as well as its Valuation and Short List Selection Process; (2) On March 15, 2012, SCE presented its Short List Selection; (3) On May 23, 2012, SCE presented its Final Evaluation and Selection Process; (4) On June 20, 2012, SCE presented its Final Section. SCE stated that during each of these teleconference calls, the PRG and CAM members were updated on the progress of SCE’s 2011 CHP RFO and consulted on the valuation and merits of the individual projects.

SCE has complied with the Commission’s rules for involving the PRG. Should SCE choose to renegotiate the Agreements according to any options provided for in this Resolution, SCE is not required, though is encouraged, to consult with its PRG again prior to submitting an amended Agreement.

Independent Evaluator Review

SCE retained Independent Evaluator (IE) Merrimack Energy Group, Inc (“Merrimack Energy”) to oversee the filing of AL 2771-E and to evaluate the overall merits for Commission approval of the LMEC and Gilroy Agreements. AL 2771-E included a public and confidential Independent Evaluator’s report. In its report, the IE determined that the Calpine Agreements, in the IE’s opinion, merit Commission approval. AL 2771-E included a public and confidential Independent Evaluator’s report. In its report, the IE determined that:

- i) SCE’s 2011 CHP RFO was conducted consistent with the requirements set forth in the CHP Settlement Agreement.
- ii) While there were certainly issues of interpretation regarding the meaning of the Settlement in various contexts SCE’s interpretations and application of those interpretations in its administration of the RFO were reasonable.
- iii) Evaluation framework and implementation of the RFO was fair and provided for fair and consistent comparisons between different types of projects and different types of counterparties. IE also stated that SCE did not provide preferential treatment to any affiliate that participated in the RFO.
- iv) SCE acted reasonably in selecting the five offers for contract award and execution totaling over 800 MW, and the resulting contracts, including the Calpine Agreements, merit approval by the Commission.⁷

IE concludes that SCE selected the appropriate bids from the CHP RFO and acted without prejudice and therefore, recommends Commission approval of the two Calpine Agreements. More information on the findings of the IE Report is included in Confidential Appendix A.

The Independent Evaluator concurs with SCE’s decision to execute the LMEC and Gilroy Agreements with Calpine Energy Services, L.P. and finds that the LMEC and Gilroy agreements merit Commission approval. SCE has complied

⁷ Public IE Report p.38

with the Commission's rules for involving the PRG. Should SCE choose to renegotiate the Agreements according to any options provided for in this Resolution, SCE is not required, though is encouraged, to consult with its PRG again prior to submitting an amended Agreement.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

FINDINGS AND CONCLUSIONS

1. The LMEC facility is an eligible CHP resource with two steam hosts; is a CHP facility with a nameplate capacity larger than 5 MW; meets the definition of cogeneration facility under California Public Utilities Code §216.6; meets the federal definition of a qualifying cogeneration facility under 18 CFR §292.205 implementing PURPA; and meets the Emissions Performance Standard established by Public Utilities Code §8341 (Senate Bill 1368).
2. The Gilroy facility is an eligible CHP resource with a steam host; is a CHP facility with a nameplate capacity larger than 5 MW; meets the definition of cogeneration facility under California Public Utilities Code §216.6; meets the federal definition of a qualifying cogeneration facility under 18 CFR §292.205 implementing PURPA; and is exempt from the Emissions Performance Standard established by Public Utilities Code §8341 (Senate Bill 1368).
3. Pursuant to the QF/CHP Settlement, Section 4.2.2, capacity-only products are not expressly prohibited from competing in CHP-only RFOs. They are not expressly invited either.

4. A provision for Utility Prescheduled Facilities is expressly provided for in the QF/CHP Settlement Agreement and is designed for capacity-only contracts from such facilities.
5. The QF/CHP Settlement Agreement is ambiguous as to whether capacity-only products, other than from Utility Prescheduled Facilities, are invited in CHP only RFOs.
6. The current LMEC and Gilroy Agreements in Advice Letter 2771-E should be rejected because it would occupy too many reserved CHP MW with a capacity-only contract, removing opportunities for other CHP facilities to provide benefits to SCE.
7. The Commission should allow renegotiated Agreements, consistent with one of the three options outlined below, to be resubmitted to the Commission and approved via Tier 1 Advice Letters, as long as they conform to the terms of this Resolution:
 - QF/CHP Agreements for RA-only capacity that match the level of energy output delivered to the LMEC and Gilroy steam hosts, but are otherwise identical to the instant LMEC and Gilroy Agreements.
 - QF/CHP Agreements for RA-only capacity that match the level of baseload power output from the LMEC and Gilroy facilities but are otherwise identical to the instant LMEC and Gilroy Agreements.
 - QF/CHP Agreements for RA-only capacity that are for one half or less of the contracted amount in the instant Agreements (up to no more than 140.25 MW associated with LMEC and 60 MW associated with Gilroy), but are otherwise identical to the instant LMEC and Gilroy Agreements.
8. If SCE renegotiates LMEC and Gilroy Agreements consistent with the options outlined in this Resolution, the following findings in this Resolution would apply to such a conforming new Agreement.
 - a. As an existing CHP Facility, per QF/CHP Settlement Term Sheet Section 7.3.3.1, LMEC capacity would not contribute towards SCE's GHG Targets and is neutral for GHG accounting purposes.

- b. The LMEC and Gilroy facilities are existing CHP facilities and therefore would be a viable project.
- c. The terms of the LMEC and Gilroy agreements for a capacity-only PPA would provide the CHP Attributes, the RA Attributes, the Local RA Attributes, and the Capacity Attributes equivalent to the capacity associated with the LMEC and Gilroy Agreements to the ratepayers.
- d. Capacity-only LMEC and Gilroy PPAs are not subject to the EPS under D.07-01-039 as it was deemed to be compliant with the EPS, as it is a combined-cycle natural gas facility that was in operation prior to June 30, 2007.
- e. SCE would not be allowed to allocate the net capacity costs and associated RA benefits to bundled, DA, CCA, and departing load (to the extent not exempted) customers consistent with D.10-12-035, as modified by D.11-07-010.
- f. Actual LMEC and Gilroy Agreement costs will be recovered through ERRR, less net capacity costs recovered in the NSGBA.
- g. SCE has complied with the Commission's rules for involving the PRG. Should SCE renegotiate the LMEC and Gilroy Agreements, they should be encouraged but not required to consult again with their PRG.
- h. The Independent Evaluator concurred with SCE's decision to execute the LMEC and Gilroy Agreements with Calpine Energy Services, L.P. and found that the LMEC and Gilroy PPAs merits Commission approval. Should SCE renegotiate the LMEC and Gilroy Agreements, as long as the per-MW costs do not increase, they should not be required to subject the amended Agreement to additional IE analysis prior to resubmitting to the Commission.

THEREFORE IT IS ORDERED THAT:

1. The request of Southern California Edison (SCE) in Advice Letter 2771-E for Commission approval of the Los Medanos Energy Center and Gilroy Agreements with Calpine in its entirety are denied.
2. SCE is authorized to renegotiate amended Agreements with Calpine if they are consistent with one of the following three Options, with Option 3 indicating the maximum procurement amount PG&E is authorized regardless of which Option is executed:
 - Option 1: QF/CHP Agreements for RA-only capacity that match the level of energy output delivered to the LMEC and Gilroy steam hosts, but are otherwise identical to the instant LMEC and Gilroy Agreements.
 - Option 2: QF/CHP Agreements for RA-only capacity that match the level of baseload power output from the LMEC and Gilroy facilities but are otherwise identical to the instant LMEC and Gilroy Agreements.
 - Option 3: QF/CHP Agreements for RA-only capacity that are for one half or less of the contracted amount in the instant Agreements (up to no more than 140.25 MW associated with LMEC and 60 MW associated with Gilroy), but are otherwise identical to the instant LMEC and Gilroy Agreements.
3. If SCE renegotiates amended Agreements with Calpine consistent with one of the three options outlined in Order Paragraph 2, SCE shall resubmit the amended Agreements via a Tier 1 Advice Letter within 30 days after the approval of this Resolution.
4. SCE is encouraged, but not required, to consult with its Procurement Review Group about any amended Agreements consistent with Order Paragraph 2 prior to submitting amended Agreements to the Commission via a Tier 1 Advice Letter.
5. If SCE negotiates amended Agreements consistent with Ordering Paragraph 2, as long as the per-megawatt cost of the contract is not increased from Advice Letter 2771-E, additional review by an Independent Evaluator is not required.

6. SCE shall not invite or accept any capacity-only contracts in their existing or future Combined Heat and Power solicitations, except as Utility Prescheduled Facilities as defined in the Qualifying Facility/Combined Heat and Power Settlement Agreement adopted in Decision 10-12-035.
7. For any other capacity-only contracts signed by SCE as a result of their first Combined Heat and Power Requests for Offers required under the Qualifying Facility/Combined Heat and Power Settlement Agreement adopted in Decision 10-12-035, the same options outlined in Ordering Paragraph 2 of this Resolution will be available, if contracts are renegotiated and resubmitted for Commission approval, as applicable.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on June 27, 2013; the following Commissioners voting favorably thereon:

Paul Clanon
Executive Director

Confidential Appendix A

REDACTED