BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Develop an Electricity Integrated Resource Planning Framework and to Coordinate and Refine Long-Term Procurement Planning Requirements.	Rulemaking 16-02-007

ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENTS ON INPUTS AND ASSUMPTIONS FOR DEVELOPMENT OF THE 2019-2020 REFERENCE SYSTEM PLAN

This ruling seeks formal input from parties on the modeling inputs and assumptions to be used in the development of the Reference System Plan (RSP) for the 2019-2020 cycle of the Integrated Resource Planning (IRP) process, as described in Decision (D.) 18-02-018. This ruling contains two attachments with the proposed inputs and assumptions, developed by California Public Utilities Commission (Commission) staff and consultants. Many parties have already provided informal comments to Commission staff on earlier versions of these materials. Interested parties are now invited to file and serve formal comments on this ruling and attachments by no later than December 12, 2018, with reply comments due no later than December 19, 2018.

1. Proposed Inputs and Assumptions for 2019 RSP Development

For purposes of the development of the RSP in 2019, Commission staff propose to continue to use the RESOLVE model, which was also used to develop the previous RSP in 2017 that was ultimately adopted in D.18-02-018. This choice is chiefly related to the time constraints associated with needing to begin the process to develop the 2019 RSP very soon, along with parties' familiarity with the RESOLVE model from the previous IRP cycle. Though there may be advantages and disadvantages to the use of this particular model, those pros and cons are already familiar to the Commission and to engaged parties.

Also similar to 2017, Commission staff, with assistance from consultants, has developed inputs and assumptions to be utilized in RESOLVE to design optimal portfolios for the electricity grid served by the California Independent System Operator (CAISO), under a range of different forecasts of load growth, technology costs and potential, fuel costs, and policy constraints. Since the development of the original RESOLVE inputs and assumptions in September 2017,[1] Commission staff and consultants have identified numerous updates that are proposed in Attachment A to this ruling.

Earlier versions of Attachment A documentation, in two parts, have been circulated for informal comments and feedback to Commission staff.[2] That

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[1] Available for download at: http://www.cpuc.ca.gov/irp/proposedrsp/

[2] A document titled "Draft Data Sources for 2019-20 IRP Supply-Side Resource Modeling" was circulated to the service list for this proceeding on March 29, 2018, and "Draft Data Sources for 2019-20 IRP Demand Projections, Demand-Side Resources, and System Parameters" was circulated on July 10, 2018.

informal feedback has been taken into account in the development of Attachment A.

Attachment A describes the key data elements and proposed sources of inputs and assumptions for the Commission to use in the 2019-2020 IRP cycle. It also summarizes the proposed methodology for how different data components will be used within the RESOLVE model. This ruling seeks formal comments from parties on the proposals in Attachment A.

A further updated version of this document, after additional feedback from parties in response to this ruling, and also including specific input values, will accompany the preliminary RESOLVE modeling results that will be issued in 2019 for further comment and feedback from parties. Prior to that step, parties will also be given an opportunity to comment formally on the proposed major scenarios to be modeled, to be used to develop a recommended RSP for 2019-2020.

In Attachment A, for many of the resource types or variables identified, Commission staff lists several options for underlying assumptions to be used. The assumptions in each area can be used as building blocks for developing scenarios to be tested with modeling runs. In order to evaluate each scenario, it is helpful to identify a "base case," against which the other scenarios (which test multiple variables at once) or sensitivities (which test one variable at a time) can be compared. Since having a menu of options for many categories of resources or variables can lead to hundreds of combinations of scenarios or sensitivities, below is a summary of the suggested complete "base case" set of assumptions, against which all of the other optional assumptions can be compared. Further detailed descriptions of the "base case" assumptions are included in Attachment A.

To form the "base case" scenario, the following assumptions are suggested:

1. **Load Forecast.** The load forecast to be utilized for the base case scenario is made up of the following components:

    a. The "mid-demand" version of the retail sales forecast of the California Energy Commission (CEC) in its Integrated Energy Policy Report (IEPR) for 2018;

    b. The "mid" level assumptions about additional achievable energy efficiency (AAEE), (Scenario 3) which includes currently-funded energy efficiency programs that are cost-effective;

    c. Non-photovoltaic (PV) self-generation, at the level forecasted in the CEC's IEPR;

    d. Behind-the-meter (BTM) PV, using the CEC's IEPR "mid" case for additional achievable PV (AAPV);

    e. Electric vehicle demand, using the CEC's IEPR "mid" case forecast for electric vehicle load;

    f. Building and other electrification, at the level forecasted in the CEC's IEPR; and

    g. The CEC's "mid" case assumptions on the impacts of residential time-of-use (TOU) rates.

Together, these assumptions will form the base case load forecast that is suggested for use in RESOLVE.

2. **Baseline Resources.** These resources are made up of the following types of resource assumptions:

    a. Existing resources are assumed to be available for dispatch in the year being modeled.

    b. Planned resources with contracts approved by the Commission or the board of a community choice aggregator (CCA), but not yet constructed, will be included in the baseline, but discounted by 15 percent to account for a reasonable amount of contract failure.

c. Planned resources included in the 2018 individual IRP filings that are not yet reflected in approved contracts will be included in the baseline, but discounted by 50 percent to account for their additional uncertainty.

d. Planned retirements will be subtracted from the available baseline resources. Additional functionality in this new version of the RESOLVE model will also allow for testing economic retirement of some types of resources. For the base case scenario, this ruling proposes to utilize an age-based retirement assumption, with thermal generation over 40 years old being retired, unless the resource is already under contract for longer.

3. **Candidate Resources.** These resources represent the menu of new resource options from which the model can select, to create an optimal portfolio for future resource planning years. Candidate resources include natural gas generation, renewables (biomass, geothermal, solar PV, and onshore wind), energy storage, and demand response. Where relevant, resources may either be utility-scale or distributed. Depending on data availability and reliability, after feedback from stakeholders, offshore wind may also be added as a candidate resource.

In-state renewables will be utilized as candidate resources after applying an environmental screen related to siting. Attachment A includes several options to test sensitivity, but the base case will apply Category 1 and 2 exclusions, developed through the Renewable Energy Transmission Initiative process. In-state candidate renewable resources will also be assumed, in the base case, to utilize existing transmission capacity either as fully deliverable or with energy-only status, but without developing new transmission.

Out-of-state resources will also be candidate resources, with the base case modeling only those out-of-state renewables that can be developed utilizing existing transmission capacity. Attachment A describes other options for this assumption.

Finally, the banks of renewable energy credits (RECs) held by some load-serving entities (LSEs) for renewable portfolio standard (RPS) compliance purposes can have a material impact on the number of candidate resources the model needs to select. For the base case, the REC banks will be modeled assuming liquid trading among LSEs in a manner to be optimized within the model.

1.1. Questions for Parties on Attachment A

This ruling includes several specific questions below, where feedback from parties will be helpful on Attachment A. Parties are also invited to comment on any other aspect of Attachment A, even if there is not a specific question formulated below. When commenting, parties are requested to refer to the appropriate section number of Attachment A (e.g., Section 1.1) and be as specific as possible, providing documentation, citations, and rationale to support each recommendation.

1. **Base case selection.** Please comment on the recommended base case assumptions outlined in Section 1 above. What assumptions would you modify and why?

2. **Baseline resources.** What changes would you make to the assumptions in Section 3 of Attachment A with respect to baseline resources? Explain.

3. For planned resources with Commission- or CCA-board-approved contracts, for which the Commission may need to seek additional information as described in Section 3 of Attachment A, in the base case:

   a. Is the existence of an approved contract a reasonable determinant for inclusion in the baseline? Why or why not?

       b. Is it reasonable to assume a 15 percent failure rate for these approved contracts? If not, what are the sources of uncertainty for these types of resources and how should the Commission plan and account for that uncertainty?

       c. Provide data sources that speak to contract success rates.

4. For planned resources without approved contracts in the base case:

       a. What criteria should the Commission use to evaluate whether it is reasonable to assume that a planned resource will be completed?

       b. Is it reasonable to assume a 50 percent failure rate for these types of resources? If not, what are the sources of uncertainty for these types of resources and how should the Commission plan and account for that uncertainty?

       c. Provide data sources that speak to contract or project success rates.

5. As described in Section 3.1 of Attachment A, the 2019-2020 IRP version of RESOLVE will be capable of retiring baseline thermal resources economically within the optimization process. Fixed operations and maintenance costs of baseline thermal resources will be added to RESOLVE's optimization logic, such that existing thermal generators may be retired by the model, subject to reliability constraints, if it is cost-effective to do so. Provide suggestions for data sources that could be used for the fixed operations and maintenance costs of baseline/existing thermal resources.

6. **Candidate resources.** Section 4 of Attachment A outlines the proposed candidate resources from which the model can choose for the development of new resources beyond the baseline.

       a. General: Comment on the appropriateness of all of the resource types proposed to be modeled.

       b. Storage: Does the proposed approach for modeling energy storage in RESOLVE adequately reflect the latest available storage technologies? What energy storage

technology types would require significantly different input values? Explain in detail how the inputs would vary.

c. <u>Offshore Wind:</u> Public data about offshore wind cost and potential in California may be limited and/or outdated. Comment on what data is currently available regarding offshore wind development in California and its possible limitations. If you are aware of new data expected to become available in the next year or two, for example through the work of the California Intergovernmental Offshore Renewable Energy Task Force, provide specific reference to that information.

7. Should large periodic maintenance costs to utility-scale generators be included in IRP modeling? If so, what data sources should be used to estimate these costs? Please refer to Section 3.1.1 of Attachment A for more discussion of this issue.

8. IRP modeling in 2017 optimized investment and system dispatch for four representative years: 2018, 2022, 2026, and 2030. The number of representative years represents a balance between precision and model runtime. In modeling for the 2019-20 IRP cycle RSP, Commission staff again proposes to limit the simulation to four years, replacing the 2018 Year with 2020, but continuing to include Years 2022, 2026, and 2030. Then, in the next IRP cycle, study years would become 2022, 2026, 2030, and 2034, with the subsequent cycle addressing Years 2024, 2026, 2030, and 2034 (and so on). This allows for continuity and comparison of assumptions and results across IRP cycles, while continuing to focus between 10 and 12 years in the future. Do you support this approach or recommend a different distribution of study years (i.e., updating the study years with each IRP cycle)? Explain your answer.

9. In order to analyze the Senate Bill (SB) 100 goal of 100 percent of retail electricity sales being supplied by zero-carbon resources by 2045, Commission staff are also considering using RESOLVE to run a limited number of scenarios on years beyond 2030. Considering the significant amount of modeling and run-time cost of each additional planning year, as well as potentially

limited availability of data for years beyond 2030, what year(s) should be studied (e.g., 2035, 2040, 2045) and why?

10. Voluntary procurement of in-front-of-the-meter renewables beyond statutorily-required levels could impact the development of new renewable energy facilities. For example, many LSEs have programs that allow customers to choose a higher portion of renewables in their electricity supply than required by the RPS, which could result in a need to build additional new renewable energy facilities. Should RESOLVE include projections of voluntary planned procurement (but not yet contracted) when developing future resource portfolios? If so, what are publicly available sources of information that could be used to forecast the volume of such procurement?

11. How should the utilization of the LSEs' current and forecasted REC banks be represented in RESOLVE? Which of the modeling options described in Section 8.3.2 of Attachment A are most appropriate for the base case? What additional options should be considered?

12. Provide any additional comments on the appropriateness of the draft inputs and assumptions proposed for the 2019 RESOLVE model runs for IRP purposes. What changes would you make and why? Please include references to the appropriate section number of Attachment A.

2. Proposed Approach for Estimating Criteria Pollutant Emissions

Attachment B to this ruling includes a proposed approach for estimating criteria pollutant emissions in the 2019-2020 cycle of IRP. Attachment B also explains the role of the Commission's IRP criteria pollutant work relative to the work of other agencies and stakeholders that are part of California's air quality landscape.

In the 2017-2018 IRP cycle, Commission staff estimated the amounts of nitrogen oxides (NOx) and particulate matter less than 2.5 micrometers in size (PM 2.5) that would be emitted under various possible system conditions, to

develop and inform the selection of the 2017-2018 RSP. Attachment B reviews the approach and recommends improvements to the methodology for the 2019-2020 IRP cycle.

2.1. Questions for Parties on Attachment B

This ruling includes several specific questions below, where feedback from parties will be helpful on Attachment B. Parties are also invited to comment on any other aspect of Attachment B, even if there is not a specific question formulated below.

1. Are there any emissions factors that should be used instead of those listed in Tables 1 and 2, or sources already cited in party comments referenced, in Attachment B? Please provide the specific factor, category of unit to which it applies, data source, and reason why it should be used.

2. Comment on the suggested steady-state emissions factors for biomass and diesel units in Table 3 of Attachment B. Propose factors for cold, warm, and hot starts, as well as sources for suggested values.

3. Suggest emissions factors for geothermal facilities and provide sources for suggested values.

4. Should out-of-state emission be accounted for as part of criteria pollutant emissions? Why? If so, how?

5. Suggest any methodologies to assist with understanding the impacts of system-level emission on the ambient air quality of local communities.

6. Provide any other comments or suggestions on issues raised in Attachment B.

IT IS RULED that:

1. Interested parties may file and serve comments on this ruling, the specific questions in Sections 1.1 and 2.1 of the ruling, and Attachments A and B, by no later than December 12, 2018.

2. Interested parties may file and serve reply comments in response to this ruling by no later than December 19, 2018.

3. Parties will have additional opportunities to comment on the main scenarios proposed to be modeled to develop the 2019-2020 Reference System Plan in early 2019.

Dated November 29, 2018, at San Francisco, California.

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/s/ JULIE A. FITCH

Julie A. Fitch
Administrative Law Judge

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