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 (Filed February 11, 2016)

INFORMAL COMMENTS OF THE CALIFORNIA WIND ENERGY ASSOCIATION ON ENERGY DIVISION QUESTIONS REGARDING PROPOSED APPROACH TO SCENARIO DEVELOPMENT FOR IRP

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Pursuant to the October 24, 2016, email from Forest Kaser of the California Public Utilities Commission's ("CPUC" or "Commission") Energy Division staff, the California Wind Energy Association ("CalWEA") submits these informal comments on the Energy Division's questions posed in the webinar slides titled "Proposed Approach to Scenario Development for Integrated Resource Planning," ("IRP") dated October 24, 2016. Prior to responding to the specific questions posed in the webinar slides, CalWEA provides overarching comments.

Overarching Comments

CalWEA believes that the Energy Division's proposed approach to scenario development for IRP is unnecessarily complicated and could bog down and even threaten the success of the process. The proposed approach involves developing numerous Resource Acquisition Plans, five futures, and multiple criteria and weighting factors. Instead, CalWEA recommends that Energy Division develop one least-cost IRP using reasonable mid-range assumptions about future conditions and run a few post-processing sensitivities on the plan to determine whether additional objectives can be met at a reasonable cost.

There is no need to develop multiple Resource Acquisition Plans because every plan should assume that we want all cost-effective energy efficiency and a least-cost combination of available resources using the best available information. Things like "1,500 MW of Wyoming wind" should not be an objective (input) of the plan; the plan should inform LSEs and the Commission about what a least-total-cost portfolio that maintains reliability and achieves GHG

targets looks like, and whether any of the resources in the least-cost portfolio require near-term investment by multiple LSEs.

The IRP process will be an iterative one that is revisited every two years. The Commission does not need to, and should not, make momentous decisions based on a foggy crystal ball. Moreover, it is not necessary to account for and resolve all uncertainties in the first round of IRP. There will be no "answers" among a plethora of "what ifs" and uncertainties. Rather, Energy Division should use reasonable assumptions, conduct a few sensitivities, and let the Commission make judgments about what, if any, significant investments are warranted now and then revisit the assumptions two years hence. Therefore, we strongly encourage Energy Division to simplify the process, as discussed in greater detail below.

Questions On Developing Futures

1. ***What additional uncertainties that would impact long-term planning in California have not been captured in this inventory?***

CalWEA has two additional uncertainties to add to the inventory: distribution-grid upgrade costs to accommodate high levels of distributed generation ("DG"), and the willingness of non-CAISO load-serving entities (LSEs) to accept excess generation, as discussed below. However, these and the other "uncertainties" should be evaluated in post-processing sensitivity analyses rather than in alternate "futures." The various "uncertainties" should be viewed instead as outputs of the IRP process based on appropriate assumptions into the process; these assumptions can be tested in sensitivity analyses. Not only are these "uncertainties" (as stated) not appropriate for including as possible "futures," but handling them through sensitivity analyses will greatly simplify the process of developing an optimal portfolio.

In general, for future circumstances largely outside of the Commission's control (e.g., levels of efficiency), the IRP analysis should use a midrange value of best available information and update that value in the next IRP cycle. Other "uncertainties" that reflect potential preferences (such as achieving greater resource diversity or lowering GHG levels beyond statutory goals), sensitivity analyses can be used to inform Commission decisions. Specifically, the following "uncertainties" should be revisited:

- **"BTM PV Adoption"** – A cost-effective level of behind-the-meter photovoltaic solar should be an output of the IRP process, not an input assumption.

Rather than assuming arbitrary levels of BTM PV in different "futures," the IRP process should produce an optimal level of BTM PV. While there will always be some level of uncertainty in BTM PV adoption, that level will be strongly influenced by policy, such as NEM rates, which will directly impact California ratepayers. The IRP should help inform the Commission's 2018 NEM rate design decision and should be one of IRP's chief purposes. The optimal level of BTM PV should be informed by a reasonable assumption of distribution-grid upgrade costs, which can be tested with a post-processing sensitivity analysis.[1]

- **"In-State Diversity"** – Similarly, resource diversity should be an output of the IRP process, not an input subject to uncertainty. (See below for further discussion on diversity.) Moreover, "in-state" diversity has no place under the RPS statute; if anything, the reference should be to "Product Content Category 1 Diversity."

- **"Regionalization"** – First, as explained below, "regionalization" (by which we assume Energy Division means "CAISO expansion") is not the only means of accessing WECC renewables or of exporting excess generation from the existing CAISO footprint. Therefore, instead of including "regionalization" as the uncertainty, the IRP process should:

  (a) include the "willingness of non-CAISO LSEs to accept excess generation" as an input assumption, which can be tested with a post-processing sensitivity analysis, and

  (b) include as an input assumption that regional renewable resources will become increasingly available to California with or without CAISO expansion.

To elaborate with regard to exports: there is presently no regulatory, physical or technical impediment to exporting excess power from the CAISO; the issue is an economic one – whether non-CAISO LSEs have an appetite for that power. Thus, while CAISO expansion would facilitate such trades, the fundamental economics will remain the same. Two key issues that will influence non-CAISO LSE decisions will be whether they likewise expand their renewable programs by heavily relying on solar generation, and whether they are willing to back-down their non-renewable generation to accept California's excess generation.

Earlier in this LTPP-IRP process, several parties noted that an assumption of no-net exports is unreasonable,[2] and proposed various assumptions for export levels. CalWEA

[1] For example, the cost assumptions could include SCE's General Rate Case request to make a capital expenditure of $2.3 billion for 2016 through 2020 to support the DG future that SCE envisions. The Commission's GRC decision should be informed by the IRP results.

[2] See, in R. 13-12-010, the February 22, 2016, opening comments of Calpine at p. 4, TURN at p. 3, LSA at p. 3, SCE at p. 4, ORA at p. 3, TransCanyon at p.3, PG&E at p. 14, NRG at p. 4, and SDG&E at pp. 7-8.

recommended that the Commission obtain the level of exports that was determined to reasonably occur as an output of a recent WECC-wide operational study, without assuming significant institutional changes, which the study portrays as "significant."[3] Therefore, rather than including "regionalization" as an uncertainty, the IRP process should instead include a reasonable export level as an assumption in the IRP production simulation model and test other assumptions through a sensitivity analysis.

To elaborate with regard to the availability of regional renewables, substantial regional renewables – including, most importantly, low-cost wind resources – can be accessed without the expansion of the CAISO grid and without significant new transmission.[4] This is already occurring and will continue to occur given (1) planned and potential coal retirements that will free up transmission capacity in the WECC, and (2) wind energy resources that can be accessed through dynamic transfer arrangements with the CAISO. Therefore, rather than including "regionalization" as an uncertainty, the IRP process can include as an input assumption that regional renewable resources will become increasingly available to California with or without CAISO expansion. The optimal IRP portfolio will then reflect a cost-effective level of regional renewables.

- **"Future Policy Goals"** – No explanation was provided for this uncertainty but, in any case, given California's existing ambitious goals, we see no reason to try to anticipate additional goals. Any additional adopted policy goals can be factored into future IRP cycles.

- **"Customer Behavior"** – The uncertainty over whether a doubling of efficiency can be achieved subject to considerations of achievability and cost-effectiveness is best handled by assuming a midrange value of best available information and updating that value in the next IRP cycle. The same applies to flexible loads, electrification, and energy storage costs.

[3] See R. 13-12-010, CalWEA's February 29, 2016, Reply Comments, citing NREL/E3 "Western Interconnection Flexibility Assessment Final Report" (December 2015), at p. xxvi. CalWEA noted that Energy Division staff will need to contact NREL/E3 and request that they calculate the export level, as it is not indicated in the report. Available at: https://www.ethree.com/documents/WECC_Flexibility_Assessment_Report_2016-01-11.pdf.

[4] See Byron Woertz, WECC Reliability Study Requests (filename: 10-29-15_CREPC-SPSC-WIRAB_woertz_WECC_reliability_study_requests.pdf). Also see CalWEA's 4/28/16 Comments submitted in the RETI 2.0 process, which analyze the WECC study. The WECC study shows that the retirement of over 6,000 MW of coal units that are already scheduled to occur by 2024 will enable approximately 3,500 MW of wind energy and 1,800 MW of solar to be accessed through dynamic transfer (DT) arrangements with the CAISO (or via an expanded CAISO) without any transmission upgrades (some 600 MW of New Mexico wind projects under dynamic transfer arrangements and using existing transmission are already under construction). The retirement of 16,000 MW of coal capacity (about half that now operating) would enable 9,600 MW of wind and 4,800 MW of solar to be dynamically scheduled with very modest transmission upgrades.

2. ***Which of these uncertainties would you prioritize as most important for consideration in the development of alternative futures? (Provide a ranked list)***

As with energy efficiency goals, the following have the potential to significantly influence the optimal portfolio: flexible loads, electrification, and energy storage costs. However, for three reasons, CalWEA recommends using reasonable mid-range values for these factors rather than creating "alternative futures": (1) large procurement decisions should not be based on a speculative future; (2) the IRP process is already very complex and trying to accommodate a large number of uncertainties will make the exercise totally intractable; and (3) the IRP process will be repeated every two years and so the Commission can update the key factors during each cycle.

3. ***Which interactions between uncertainties would you prioritize as most important? (Provide a ranked list)***

As explained above, CalWEA recommends eliminating several items as "uncertainties" and using reasonable mid-range values for these factors rather than creating "alternative futures" that will have "interactive effects." Instead, some of these factors can be tested as sensitivities, as discussed below.

Otherwise, CalWEA sees the relationship between energy storage costs, flexible loads, and renewable costs as important: if renewables costs go down dramatically, we can curtail them with less consequence and therefore the IRP model will be relatively insensitive to the cost of storage. Similarly, if the cost of storage becomes very cheap or loads become very flexible, the model will accept higher-cost renewables (or renewables with high curtailment costs).

<u>Questions on Designing Resource Acquisition Plans</u>

1. ***How would you prioritize the questions proposed by Energy Division on slides 45-46 (pumped storage, out-of-state wind, geothermal, distributed generation)?***

It is the purpose of IRP to determine the optimal portfolio of all resources on the CAISO grid, including all of the resources that are the subject of the proposed questions. Therefore, there is no need to ask the type of questions that Energy Division poses, and posing them would introduce unnecessary complexity and subjectivity. Worse yet, if such questions are necessary, it could indicate that Energy Division's model is lacking in needed capabilities.

A primary purpose of system-level planning is to determine if there is value in acquiring resources that no single LSE is likely to procure on its own (and then to ensure that those resources are acquired[5]). Thus, done properly, the results of IRP should indicate whether bulk storage,[6] major transmission lines to access concentrated wind resources, geothermal resources or higher levels of distribution-grid DG are part of an "optimum" portfolio of resources necessary to achieve California's GHG goals in least-cost fashion.

Again, it is essential that the assumptions in the IRP modeling are reasonably accurate. As discussed above, for example, it is essential that the model properly represent: the availability of WECC wind resources to California with or without CAISO expansion or new transmission; the ability of non-CAISO LSEs to accept California's excess generation; and the distribution-grid upgrade costs that would be needed to accommodate high levels of DG. Again, reasonable mid-range assumptions should be used, and can be tested with post-processing sensitivity analyses.

Finally, the example questions appear to assume that certain resources (geothermal and DG resources) need to be "prioritized to facilitate long-term decarbonization goals." One question suggests that the "value under uncertainty may not be adequately captured by market signals." The assumption that any resource requires prioritization beyond what the results of IRP demonstrate needs to be clearly explained. As Energy Division has indicated on slide 9, the purpose of IRP is to "inform a near-term action plan" while the remainder of IRP represents "a plausible view of the future" that is "subject to change in subsequent IRPs as more complete and current information becomes available." The IRP process will be repeated every two years; action need not be taken now based on significant uncertainties, rather, action should be based on reasonably certain information.

2. ***Are there any other resource acquisition decisions or questions that merit consideration in the 2017 IRP process? How would you prioritize those questions relative to those on slides 45-46?***

As discussed in answer to question 1, CalWEA believes that no purpose is served in asking the types of questions indicated on slides 45-46. Regarding resource acquisition

[5] See CalWEA's October 14, 2016, Informal Comments on IRP in this proceeding.

[6] As there are several types of bulk storage (e.g., rail energy storage and compressed air storage), the reference should be to "bulk storage" not to "pumped storage."

decisions, it is essential that the Commission have a clear process for acquiring, and allocating the costs of, any resources that are demonstrated to be cost-effective in achieving 2030 GHG goals but that are not likely to be acquired by any single LSE. CalWEA discussed these issues in previous comments.[7]

Questions on Selecting a Portfolio

Criteria and Metrics

1. ***Are there any other criteria that Energy Division should consider when determining which portfolio to recommend as part of the Reference 40% By 2030 Plan (beyond those presented in slide 53)? If so, please explain why such criteria should be considered in the development of the Reference 40% By 2030 Plan rather than in LSE plans and/or the LSE-Preferred 40% by 2030 Plan?***

The IRP process would benefit from several adjustments to the criteria presented. For reasons discussed below, the criteria for "diverse and balanced" and "optimal integration in a cost-effective manner" are not appropriate as criteria, and addressing zero-emitting resources to the maximum extent reasonable" should be considered with a separate run of the model.

The words "diverse and balanced" in Public Utility Code 454.51(a) should be read in the context of the rest of the sentence: "Identify a diverse and balanced portfolio of resources needed to ensure a reliable electricity supply that provides optimal integration of renewable energy in a cost-effective manner." Thus, a "diverse and balanced portfolio" is in service to the ends stated – reliability and optimal, cost-effective integration of renewables. The purpose of IRP is to determine the least-cost portfolio within the constraints of meeting established reliability standards and of meeting GHG planning targets for the electric sector. To the extent that a more diverse and balanced portfolio will achieve these ends more cost-effectively than a less diverse portfolio – and various studies[8] have demonstrated this – the IRP process should identify an optimal, diverse mix. Any criteria that attempts to judge whether there is enough diversity would be subverting the primary goals of achieving GHG goals at least-cost while maintaining reliability. Moreover, any such judgment would be subjective and thus introduce more controversy into an already complex process.

[7] See Note 5, *supra*.

[8] Many of the studies noted on slide 18 show the reliability and total-cost value of a more diverse renewables portfolio.

If a "check" on the IRP process with regard to diversity is desired, then a post-processing sensitivity could be run to force-in greater diversity to test the IRP results for any improvements in cost, reliability, or GHG emissions. If greater diversity is possible without significantly increasing cost or GHG emissions, and without reducing reliability, then the Commission could adopt that portfolio since greater diversity may be preferable all else equal. Otherwise, if greater diversity (however measured) does not provide benefits expressed by the legislature in the statute, it is not clear what purpose would be served by diversity per se.

Similarly, the proposed criteria for "optimal integration of renewable energy in a cost-effective manner" is superfluous and nonsensical. The IRP process will, if done correctly, optimize the portfolio to achieve reliability and GHG goals at least-cost; "optimal integration of renewables" is inherent to those objectives.

With regard to the statute-based criteria relating to relying on zero carbon-emitting resources to the "maximum extent reasonable," this objective should be addressed, but again would be better addressed through a post-processing exercise. Specifically, a sensitivity analysis can be conducted by re-running the IRP production simulation model and setting the model to achieve greater GHG reductions (e.g., 45% rather than 40% GHG reduction by 2030) without compromising reliability. The Commission can consider the cost of lowering GHG in this fashion and determine whether the additional cost (if any) is reasonable and, if so, select that portfolio.

2. What are the most appropriate metrics for measuring cost, GHG emissions, and portfolio diversity and why?

Cost: Both of the metrics listed – total annual system cost in $ as well as average system cost of service in $/kWh – are important. Substantial costs can be obscured if shown only in average $/kWh terms.

GHG: To provide perspective, particularly on CO2e savings beyond the statutory targets that might be achieved through greater reliance on zero-emitting resources, the incremental savings should be shown as a percentage of total CO2e. (If a sensitivity analysis is conducted as described above, that percentage would be inherent to the sensitivity.)

Diversity: As discussed above, diversity is a means to an end, not an end in and of itself. However, for purposes of any sensitivities conducted, diversity should be measured by diversity

in renewable resource production profiles (e.g., reduced concentration of output during particular periods of time).

3. ***What relative weight should each criterion be assigned? If you recommended additional criteria in your response to question 1, please indicate the relative priority of your recommended criteria.***

Consistent with our response to question 1 in this topic area, CalWEA recommends that criteria not be used, in which case weighting the criteria would be moot. Eliminating the complexity and subjectivity of weighting is another major advantage of keeping the IRP process as simple and non-controversial as possible.

4. ***Are there any other approaches for evaluating an individual criterion that Energy Division should consider (other than greatest maximum value, average value, greatest expected value, least risk)?***

5. ***Should Energy Division use one approach for evaluating each criterion, or multiple approaches?***

6. ***If multiple approaches, what relative weight should be assigned to each approach to criterion evaluation (greatest maximum value, average value, greatest expected value, least risk)?***

7. ***What criteria or principles should be used to identify the most appropriate single future to use for planning purposes (e.g., the most probable, the closest to current practices, or other?)***

Again, in response to questions 4-7, we believe that introducing criteria and various weighting factors and principles to consider them will make the IRP process more complicated and controversial than it needs to be or should be. Most of the "criteria" should be outputs of the IRP process, not inputs, and otherwise be tested in sensitivity analyses.

Diversity and Resource Type Definitions

1. ***If diversity index is appropriate metric for evaluating portfolio diversity, what diversity index is appropriate to use?***

2. ***How should resource types be defined (e.g., by technology category, hourly profile correlation threshold, or other approach)?***

   With regard to questions 1 and 2, please see our comment in response to question 2 in the preceding section.

3. ***Should there be separate definitions for supply and demand side resource types?***

   No comment at this time.

4. ***Are there any other CPUC proceedings that provide resource type definitions that IRP should use?***

   No comment at this time.

Respectfully submitted,

/s/ *Nancy Rader*

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