



IRP Modeling Advisory Group

Office Hours #4: 10/24/2017

Background

During the month of October, Energy Division staff will host one 90 minute "Office Hours" webinar each Tuesday from 1:00 pm to 2:30 pm to address technical questions from parties related to RESOLVE and/or the staff proposal "Production Cost Modeling Process to Review Integrated Resource Plan Portfolios." During the webinar, staff and technical consultants will provide verbal responses to questions submitted in writing by 4:30 pm on the Friday preceding the webinar. Following each question or topic, parties will have an opportunity to pose additional clarifying questions. In general, staff does not anticipate preparing presentation material, but may do so on occasion. Any materials prepared, as well as audio recordings of each webinar, will be available from the [IRP Events and Materials](#) page. The expectations and ground rules documented in the [Modeling Advisory Group charter](#) apply.

For more information, please contact Patrick Young at Patrick.Young@cpuc.ca.gov or (415) 703-5357 or Forest Kaser at Forest.Kaser@cpuc.ca.gov or (415) 703-1445.

Questions Submitted

The Nature Conservancy

1. Non-CAISO LSEs in RESOLVE. Is the purpose of modeling other load and transmission zones only for CAISO's internal energy balance (get imports and exports correctly; transfer between zones)?
 - a. How are the net-short (candidate) resources selected for each of the two large out-of-state zones (NW and SW)? The documentation says that these are wind generation in the NW and solar generation in the SW. Are these selected resources coming from the same REN_Supply_Curve resources via the linear optimization or are they determined exogenously? If exogenously, how are they selected?
 - b. How are non-CAISO LSE "local" solar resources selected? from the REN_supply_curve?
 - c. Are non-CAISO zones' resource inputs and portfolio outputs viewable in the dashboard? If so, where are they?
2. NGO1+2 environmental screens not available for out-of-state (OOS)resources? Solar OOS resources under NGO 1+2 screens seem to all be 100% of potential (no constraints), even in cases where the environmental baseline is 5% (see example of Arizona resources from the

REN_Supply_Curve below, with highlights below of the relevant columns and example rows comparing wind and solar resources).

3. Does RESOLVE specify whether selected candidate out-of-state resources are locally balanced or balanced by CAISO?
4. Questions about the results of the requested RESOLVE case runs.
 - a. Please clarify the difference between total resource summary and selected resource summary.
 - b. Is the selected resource amount, listed under the year 2030, incremental (MW of buildout added that year only) or cumulative (over the entire timeframe 2016-2030)?

Sonoma Clean Power

1. **System Power GHG Intensity:** Assuming we move forward with the 42 MMT scenario, what should LSEs assume for system power GHG intensity (MT CO₂e/MWh)? Correct me if I am wrong, but I think this assumption is needed by each LSE to calculate the volume of emissions avoided (through low-GHG or GHG-free power contracts), and it is therefore needed by LSEs to demonstrate alignment with the CPUC's GHG Planning Price. Is that correct?
2. **Curtailement of Renewables:** Does the Resolve model assume that renewables will be curtailed equally across the CAISO footprint, or are there specific local pockets where curtailment frequency is projected to be higher or lower? If the model is assuming that renewables will be curtailed equally across the CAISO footprint, do you happen to know if this is realistic? We're not saying it is or isn't – we just want to double check this assumption to ensure that specific LSEs will not be harmed (beyond proportion) by a generic assumption that curtailment is the best option for integration. You can imagine a scenario where additional PV at a certain node leads to reduced prices at that node or increased economic curtailment of existing PV
3. **Reference System Plan Data:** Does the Reference System Plan include data submitted after October, 2016? Some CCAs filed updated RPS plans in 2017 but we're unsure if the Commission and E3 were able to incorporate those updates into the model.

TURN

1. The 9/19 ALJ Ruling at p. 25 says "For estimating GHG emissions from in-CAISO unspecified power, LSEs should use the GHG emissions factor associated with the portfolio selected for the Reference System Plan". I am not sure what this number is. In Attachment A to that ruling, there are four slides that state the "GHG emissions factor that CARB assigns to imported electricity is larger than California CCGT emission factors" (see 56, 57, 85 & 161). Should we assume that CCGT emissions factors are a general stand-in for an RSP emissions factors?

Cogeneration Association of California

1. Removal of the RPS and Storage Mandates resulted in system costs to increase in both scenarios. Expectations were that the overall system costs would have remain about the same

or maybe decreased. Why did the RESOLVE unconstrained optimization produce increased costs?

2. Comparing the Base Case (40mmt_Ref_20170831) "Portfolio Metrics" with the results of a scenario modeling the same assumptions only performing simulations for every fourth year up to and including 2050, indicates somewhat higher costs. Are the higher costs for the multi-year scenario an indication that the "end-year effect" adjustment for the Base Case understates this effect? If not, what is the reason for increased costs?
3. It appears that RESOLVE addresses local reliability as an input assumption and not through the optimization. For example, a scenario reflecting the early retirement of all natural gas fired resources would not explicitly select resource located within a given local area. Is this a correct understanding of the model?

Resero

1. Resero Consulting is seeing the same result that SCE identified with S. Nevada renewables (SCE Question #3 for 10/17/2017 Office Hours). We have been unable to find an explanation for the oddity within the Resolve data files. For example, corollary cases 30mmt_Ref_20170831 and 42mmt_Ref_20170831, as well as a number of other corollary cases such as 30mmt_PS_20170831, 42mmt_PS_20170831 and 30mmt_OOS_20170831, 42mmt_OOS_20170831 show less S. Nevada solar siting in the 30mmt case and increased solar siting in Riverside East Palm Springs and Greater Imperial areas. The three CREZ renewables competing for deliverability are in different transmission deliverability areas, making it unlikely that they are competing for the same deliverability. Resero would appreciate it if CPUC/E3 could further investigate what factors may be driving these unanticipated oddities.
2. Where in the model can I find the transmission costs for out-of-state transmission miles and cost per mile? I thought the underlying costs came from RETI, but then it looks like WY TX cost is lower than NM TX total cost.

SCE

1. Can you please elaborate on how RESOLVE deals with the import emissions of out of state renewables? Are they subject to a Carbon Intensity assumption when coming over an importing line? How do the GHG assumptions differ for out-of-state renewables on existing transmission and unbundled resources, for example Southern_Nevada_Solar, NW_Ext_Tx_Wind, and SW_Ext_Tx_Wind?
2. In Office Hour 2, we discussed why RESOLVE optimization would fail when adding more years to the problem. At that time we understood that the limitation was the number of rows in Excel. However it seems that the longest table in Inputs2Write that varies with year is the first one, which indexes the 37 day-types with regions. So it currently has length 21,312 (37 days*hours 24*4 years*6 regions). Yet if it had 13 years (2018-2030), then it would only have 69,264 rows which is well below Excel's maximum rows of 1,048,575. It appears that the RESOLVE macro does not extend past row 60,000 in Inputs2Write, so the limitation in quantity of years is quite artificial. Can you please provide a version of RESOLVE that can run all years to 2050 (would require 175,824 rows)?

3. We did a test run adding 2050 as a 5th year but it failed. Can you provide a version that can solve this year?
4. How will CPUC translate the 37 days to a 8760 calendar shapes for the SERVM production simulation?