IRP Modeling Advisory Group

Office Hours #3: 10/17/2017

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

CEC

1. Since all of the RESOLVE scenarios contemplate additional procurement prior to 2022 to take advantage of the federal ITC and PTC wouldn't that cause the REC bank to be non-zero in those years?
2. It would be helpful to understand when these RECs were accrued since they must be redeemed within three year compliance periods. Can the RESOLVE users see the REC bank by year to better understand when RECs are accrued?
3. In the RESOLVE user interface under SYS_RPS_GHG_Targets beginning in Row 25, do these values represent the RECs used to meet the RPS target in that year?
4. The large amount of banked RECs appears to impact the 2030 GHG calculation. If the RPS is partially met by banked RECs in 2030 the only resources that can fill the needed generation gap left open from REC redemption is from GHG emitting generation. Is this a correct observation?

ORA

1. We are having trouble matching up allowance-related numbers to what we find from ARB, specifically the Carbon Cost (User Interface/ SYS_Fuel_Costs/ Row 53) and the CAISO EDU Allowances (User Interface/ SYS_Baseline_Costs/ Row 181). Do you know the reference/origin of these numbers?

Resero

1. We ran some variants on the CPUC's September cases for unconstrained wind (42mmt_Ref_unconstrained_ooswind_20170831 and 30mmt_Ref_unconstrained_ooswind_20170831). For our variants we increased the allowable wind from NM or WY from 500 MWs to quantities more in line with the potentials for the pre-existing OOS wind cases. For the 42mmt case the model solved, but for the 30mmt case the model would never solve. (We let it run for more than a day and tried it more than once.) Can you offer any feedback on why this might be?
2. Please offer any further insights as to the significance of your choosing 500 MWs as the level of wind to choose for these unconstrained wind cases.
3. There was some discussion on the last office-hours call (10/10/17) about the treatment of OOS wind Tx costs, and you referenced the prior RPS Calculator derivations. What remains unclear is whether the levelized costs for OOS wind are all inclusive or not. That is, whether they include all delivery costs or not. Please clarify what costs are factored in to, or are on top of, these levelized renewable energy costs in the REN_Supply_Curve tab. For example:
    a. There are OOS Renewable Transmission Cost adders on in the REN_Tx_Costs tab ($120 - $125/kw-year), but those cells do not seem to feed any other calculations in the workbook. Please confirm whether those are already embedded in the levelized costs or not. If not please explain how RESOLVE uses them.
    b. There are costs for exceeding full deliverability or EO limits on the REN_Tx_Costs tab. Those do seem to still be active cost adders. Please confirm that these are active and are on top of levelized costs.
    c. Please detail if there are other costs in the RESOLVE model related to delivery of NM or WY OOS wind other than those mentioned in (a) or (b) that are not included in the levelized costs in the REN_Supply_Curve tab values.

SCE

1. In RESOLVE, thermal units are aggregated based on the technology. However, it has been observed that a few major generators are excluded from the calculation of aggregated heat rates. For example, the heat rates are not provided for the OTC replacement generators like new Alamitos and Huntington Beach units. In addition, a list of generators are excluded in the heat rate calculation (field "Include in Class Characteristics" is 0). The missing or incorrect heat rate calculation in the aggregated supply curve will impact the GHG emission calculation. Why does RESOLVE exclude these mentioned resources when calculating the aggregated heat rate.
2. Why does RESOLVE have curtailment cost = $0 in CAISO but $30 in all other zones (Inputs2Write, zone_curtailment_cost table)? Last week (October 10th), we heard it explained that curtailment price is endogenous. How do these data relate to that claim?
3. Since RESOLVE is a linear programming problem, for two cases, A and B, whenever A has a tougher GHG constraint than B, then the solution for A should include all the resources of B plus additional resources. Yet we see that 42mmt_Ref has 700 MW more Southern_Nevada_Solar than 30mmt_Ref. Every other RESOLVE Resource Name has the same or less selected build. We also see that 99mmt_Ref has 62 MW of Mountain_Pass_El_Dorado_Solar while 42mmt_Ref has 0. Why would portfolios flip in this way instead of simply adding resources?
4. What is the basis for creating the import GHG offset using the assumption of 8000 GWh of non-emitting CAISO import? Why multiply by 0.82? Why the same number for each year? If the offset is intended to cover the hydro production, why not use that to determine the offset?

PG&E

1. Can you give us more insight into the development of natural gas prices (CA, NW, and SW) used in RESOLVE? What are the inputs and weights associated with developing the aggregate $/MMBtu shown in RESOLVE in the Fuel Cost tab?
2. The ALJ ruling on the Reference System Plan states on p. 13 that "The use of this RPS procurement already banked has the effect of reducing the amount of additional renewable resources that are required to be developed in the future to meet a given GHG emissions target, at least for IOUs." Could you please explain how this is implemented within RESOLVE? Is the GHG requirement reduced based on the specified bank usage input?

CalWEA

1. Regarding the 500 MW of $44/MWh New Mexico wind that can use "existing transmission" to get into CAISO: our research shows that a wheeling cost $72/kW-yr was assigned to this resource, which explains why it was not selected. However, when we look at RESOLVE data, we see the following hurdle rate from the SW to CAISO:

Transmission Line	Positive Direction	Negative Direction
SW_to_CAISO	$ 3.86	$ 9.96

This hurdle rate, shown in $/MWh, translates to about $12/kW-yr, which is far off the wheeling rate that RESOLVE is using ($72/kW-yr). Can you shed some light on this potential discrepancy?

TURN

Latest Modeling Results

1. Based on the entries in Column B and results in columns M:R of the Scenario Comparison worksheet in the Results_Viewer delivered yesterday that It appears ED has run a number of other cases in addition to those parties requested. Is ED planning to make these results public?
2. I was able to successfully copy the list of parties' cases from Column B of the Dashboard to Column B of the Scenario Comparison and conduct comparisons of the cases various parties requested. The zip file you posted yesterday did not include the results of the other cases ED has apparently run so they are not accessible.
3. The list of cases in Column B of the Scenario Comparison worksheet in the Results_Viewer includes two apparent reference cases for each of the three GHG targets, one dated 8/31 and one dated 10/1. Are there any differences between these cases? If so, what are they?

Other

4. What are the sizes of the pumped storage units that RESOLVE adds (i.e., 100 MW, 500 MW, etc.)?
5. How does RESOLVE estimate the number of starts per unit?
6. In the July results, the Results_Viewer shows differences in "Non-Modeled Costs" and "Customer Costs (Scenario Specific)" for the "42 MMT Reference Case" and the "42 MMT Reference Case w/ No Tax Credits". (See rows 70 and 79 of the "Scenario Comparison" worksheet.) In the September results, these costs are the same between these two cases. (See

rows 85 and 94 of the "Scenario Comparison" worksheet.) What is the reason for this change? Were the July inputs for one of the scenarios in error?

Green Power Institute

1. All of the costs that are reported for the Reference System Plan sensitivities are dollars in excess of the cost of the default case. This does not give the reader any indication of the order of magnitude of the reported differences in costs from the default case. In order to provide a benchmark, please answer the following questions:
   - What is the total cost of power procurement in the CAISO control area? By the three IOUs?
   - What are the combined revenue requirements of the three IOUs?
2. Can the model be re-run with corrections made to the database?
3. Can the model be run with adders used as proxies for environmental externalities?
4. Biomass energy production avoids open burning of vegetation, reducing emissions of conventional pollutants by large factors. Can these reductions be programmed into the model and used in the sensitivities on conventional pollution?
5. Biomass energy production avoids landfill burial of biomass residues, reducing emissions of short-term climate pollutants by large factors. Can these reductions be programmed into the model and used in the sensitivities on greenhouse-gas-emissions reductions?
6. Biomass energy production promotes the conduct of fuel-reduction treatments on forest lands, reducing emissions of carbon dioxide due to forest fires by large factors. Can these reductions be programmed into the model and used in the sensitivities on greenhouse-gas-emissions reductions?
7. How has the issue of data uncertainty entered into the selection of the Reference System Plan?

The Nature Conservancy

1. We have reviewed the GIS data that has been posted. Thank you for posting. Would it be possible to also post GIS files with the higher-resolution grid of capacity factors within the QRAs? Currently there is only one CF per QRA in the supply curve.
2. What exactly are the transmission attributes of the Wyoming wind resource (transmission cost, route, length of line)?
3. Is it possible to specify EO vs. FCDS transmission when "Forcing in" a resource? How does the model treat forced in resources? EO or FCDS?
4. We note that, in the SB350 study, Environmental Volume, Section 4.2.5 Biological Resources, there is a table that reports an environmental metric for each portfolio. Table 4.2-4. Biological Resources, Comparison of Scenarios for Out-of-State Buildout. The metric is: "Coverage of Most Crucial Habitat Ranks." What would it take to get RESOLVE to report results on this metric?