ENERGY FUTURES GROUP

# EnCompass Database Questions

Prepared by Energy Futures Group ("EFG")

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Energy Futures Group ("EFG") appreciates the opportunity to submit questions on SPS's EnCompass database. These questions are based on EFG's review of the EnCompass files provided on the iManage site.

SPS Responses are provided in red font below.

1. The file matrix document indicates the file named "PC_V1 Constr. PL – Result CONF" has the production cost output. However, the scenario name in the file says "CE_V1 Constr. PL" and that matches the name of the capacity expansion scenario in the file "CE_V1 Constr. PL – Result". Can SPS update this file to include the production cost run output?

   Yes.

2. The Area Monthly report in the output file named "CE_V1 Constr. PL – Result" shows sales and purchases between SPS and SPP until 2029. My understanding of the capacity expansion step is that the SPP market was turned off in the expansion runs and then allowed in the production cost runs. Is market interaction allowed in this timeframe because of the load growth in the load forecast?

   In the CE (capacity expansion) runs, market interaction was allowed through 2029. In future CE runs, SPS will turn off all market interactions during the expansion runs of the model.

3. Slide 30 from Workshop #3 indicates that CCs would be modeled at 384.2 MW with a 2028 capex of $3,586 ($000/yr) and CTs would be modeled at $2,673 ($000/yr).

   a. Can SPS confirm the capital costs are $2,812/kW for CC (based on the "CC F Generic – ST" capital cost time series and the total capacity of 513 MW?

      No, the capital cost is $3,586/kW for the summer capacity of 384.2 MW (in alignment with elevation and ambient conditions of the SW region). In Encompass the input is $ 1,377,723,500 which comes out as $3,585.95 which in the presentation was rounded to $3,586. This is without Transmission Network (TRX) costs.

   b. Can SPS confirm the capital costs are $2,537/kW for the CT (based on the "CT F Generic w/SCR" capital cost time series and a capacity of 201 MW)?

No, the capital cost is $2,673/kW for the summer capacity of 179.7 MW (in alignment with elevation and ambient conditions of the SW region). In Encompass the input is $480,207,216 which comes out as $2,672.27. This is without TRX costs.

c. Can SPS provide any transmission cost assumptions included for the CC and CT projects?

The transmission costs in the current information on iManage provided was $168.62/kW for CCs and $161.56/kW for CTs. Note: The kW of the unit is based on the summer ratings. SPS is reassigning these values to $125/kW in $2022 (or $144.96/kW in $2028) to align with our standard TRX values.

4. Are the resources with references to existing resources (including the CT references of “CT_Harrington”, “CT_Jones”, and “CT_Nichols 3”, along with the solar, wind, and battery storage resources that refer to Cunningham, Harrington, Jones, Maddox, and Nichols) representing specific replacements for those sites? For example, the EnCompass “Plan Projects” in the file named “PC_V1 Constr. PL – Result” indicate several different resource types are selected between 2040 and 2043 for new resources with a reference to Harrington, including CTs, solar, and a CC.

Yes the “locational” resources take advantage of existing points of interconnection as the existing resources at those locations retire.

a. Related to these resources, is the difference in capital costs between the “CC F Generic – ST_Harrington” project and the “CC F Generic – ST” only from transmission costs?

Yes.

b. The “Maximum Stored Energy” input field for the battery resources modeled with identified sites (for example including “Harrington”, Maddox”, “Jones”, “Nichols”, and “Quay”) seem to be the same as the input for the 4-hour, 6-hour, and 8-hour generic battery resources. This undervalues the energy storage for these resources and might be impacting the expansion results.

SPS will correct this and use the correct maximum stored energy based on the capacity and duration of the resource. However, SPS is currently only modeling 4-hour batteries as such the error did not impact the modeling outputs provided.

c. Why do the battery resources with “Quay” included have the net dispatch limit for the generic wind profile time series?

This parameter was misaligned and is being corrected for future modeling runs.

d. It seems like the battery storage projects for these sites have a different operating life assumption compared to the generic storage resources.

The operating life of all generic resources covers the entire 20-year modeling horizon. The number of years that resources are modeled past the horizon is irrelevant to the results of the model.

5. Slide 30 from Workshop #4 indicates the following annual build limits for new resources for the base case/constrained planning forecast:

| | Constraint |
|---|---|
| Battery | 1,000 MW Before 2031<br>1,500 MW 2031+ |
| Wind | 1,100 MW Before 2032<br>1,500 MW 2032+ |
| Solar | 1,000 MW Before 2031<br>1,500 MW 2031+ |
| Combined Cycle | 1 per year after 2032 |
| Combustion Turbine | 2 per year after 2032 |

The EnCompass modeling files for the base case/unconstrained planning forecast seem to indicate different assumptions for battery storage and the CT:

a. The project time series constraint for the battery storage seems to allow 1,500 MW in all years. Is this an updated annual constraint for battery storage?

The “Maximum Active Projects = 100” constraint is the binding constraint in 2027 – 2030, which limits the project additions to 1,000 MW before 2031.

b. The CT project named “CT F Generic w/ SCR” has the annual constraint time series that allows for 2 CTs starting in 2030. Is this an update that CTs will be allowed starting in 2030?

   The presentation indicated 2032 inadvertently because that is when CTs were seen selected in the model. However, CTs are available for selection starting in 2030.

6. Does the capital cost time series modeled for battery storage already reflect the Investment Tax Credit (“ITC”)?

   No.

7. Why are the battery storage resources not allowed to contribute to regulation?

   SPS is removing regulation constraints out of the model.

8. Can SPS explain how the SPP summer/winter Planning Reserve Margins (“PRMs”) are translated from the 17%/38% presented on slide 21 of Workshop #1 to the summer/winter PRMs modeled in EnCompass? Is this based on a coincidence factor adjustment?

   On April 1st and October 1st each year, SPP releases the Accredited Capacity PRM (ACAP PRM) for Winter and Summer, respectively. SPS applies the relevant percentage for each season and adjusts its forecast of the anticipated ACAP PRM based on changes to the base PRM. It should be noted that the actual ACAP PRM varies annually and by season. SPS incorporates the most recent ACAP PRM values provided by SPP into its modeling processes.

   The calculation is outlined as follows:
   Future Year ACAP PRM = SPP Accredited Capacity PRM for the upcoming season × (Future Base PRM Percentage / Current Base PRM Percentage).

9. Does the fixed O&M cost for the new CC and CT projects include assumptions for firm gas transportation?

   We are assessing this and the Company will respond back at a later date.

10. How did SPS determine the annual capacity factor limits to apply to the existing vs. new CT resources?

SPS utilized the capacity factor limits for new CTs based on capacity factor limits in bids received in the last RFP (2024 RFP) and for existing CTs it utilizes actual capacity factor limits attributed to affected existing CTs.

11. Should some of the existing thermal resources have a VOM modeled? (For example Jones 3, Cunningham 3-4, and Maddox 2). Or is the VOM for these units so low that it is not incorporated in EnCompass?

    The CT units provided in your example incorporate their variable O&M costs into their start costs.

12. It looks like new solar projects are modeled with a 20 year operating life. This seems like a shorter operating life than some of the planned resources (for example Cunningham and Plant X). Is a 20 year operating life aligned with recent RFP bids?

    The operating life of all generic resources covers the entire 20-year modeling Horizon. The number of years that resources are modeled past the Horizon is irrelevant to the results of the model.

13. The capacity expansion output seems to indicate that some of the resources do not generate in some years. For example, Nichols 1 and 2 do not operate in 2029 – 2030 and 2034 – 2035 and the Harrington units do not operate in some years). Is this also happening in the production cost runs?

    The production cost runs show consistent usage of the Harrington units. Nichols 1 and 2 still show low-capacity factors as they are older, less efficient resources.

14. The capacity expansion output also seems to show a large difference in the capacity factors between battery storage resources. Is this result being driven by resource location within the EnCompass Areas and transfer limits between Areas? (For example, there is a large difference in the capacity factors for Chaves, Lorenzo, Mammoth, Roswell, Palo Duro, and Wild Cat compared to Cunningham and the new storage resources)

    In the production costs, the capacity factors become consistent for batteries within the same area. Differences in capacity factors between resources are due to the system topology. As transmission capacity expands, the capacity factors among storage resources become closer.

15. Can SPS explain why the forward and backward limits for some of the Area Connections decrease? For example, the “SPP South Tie Limit” and “SPP WPPA > SPP Sales” decrease to 0 starting in 2030 and the “SPP tie Limit – Market Sales” decreases in value from November to December 2032.

    Part one of your question relates to the market interaction SPS is correcting as referenced in response to your question two. The second part is accurate and relates to documented expected import limits provided by Southwest Power Pool.

*16.* Will the PVRRs of each portfolio be presented based on the Capital Report PVRR costs from EnCompass or will the PVRRs incorporate any out of model adjustment for costs? If so, will stakeholders have access to those PVRR workbooks?

    Yes. PVRR workbooks will be provided and SPS does, at times, make out of model corrections for both capacity purchases and expected unserved energy cost penalties within the model. If they are made, they will be provided in the PVRR workbooks.