Questions from EUC Resource Planning Working Group

Batch 2

Submitted 9/29/2023

1. What is the status of the energy storage RFI AE issued for at least 100 MWs of storage, as required by the 2020 Resource Plan?
   It is currently being evaluated by staff.
   1. How many responses were received?
      We received responses from 31 developers representing over 200 proposals
   2. What was the longest duration storage proposed?
      The majority of proposals were either 2 hour or 4-hour batteries. There were a few proposals that represented longer duration through varying technologies such as compressed air that could be 12 hours or potentially longer.
   3. What forms of energy storage technology were proposed?
      The majority of proposals were for Lithium-ion or Lithium-iron Phosphate. There were a few proposals around compressed air. There was one proposal that utilized a proprietary technology.

2. Since that 100 MW energy storage RFI, is it true that Austin Energy issued a more specific RFP to add storage to the land at which the Decker and Sandhill gas units are present?
   Yes, see below.
   1. Please describe the capacity, duration and technology of storage that AE is presently seeking to be located at these locations if available.
      Austin Energy utilized the storage RFP to shortlist developers and then asked them to refresh their proposals based on site-specific specifications that included the Decker Plant Property given the existing transmission infrastructure and land. The RFP was for 150 MW / 300 MWH storage.
   2. What is the timeline for adding energy storage resources at Decker and/or Sandhill?
      There is no specific timeline because there is not yet a firm plan to add energy storage at these locations. Austin Energy evaluates technologies and costs to determine the right opportunity to add storage. We are incorporating current proposals in the analysis for the resource plan update.

3. Austin Energy is presently developing a standard offer community solar program. In addition to this program, does Austin Energy have plans to add any community solar to its current mix? Is a plan to add solar to a nearby landfill still something Austin Energy is pursuing? If so, what would be the capacity of that system?
   Yes, we have multiple approaches planned to add capacity to Community Solar along with the Standard Offer.
   - There is currently an RFP out for Community Solar at the landfill.
   - We are developing an RFP for Community Solar and Storage at two Resilience Hubs in coordination with PARD.
   - We are working with both PARD and the Airport to explore other Community Solar options.
     - The airport is expanding and looking to include solar in those plans.

    - PARD has been directed to develop covered parking and shaded areas and we are working with them to explore solar opportunities.
  - We are submitting an application for the Solar for All grant which targets adding 35MW to the community Solar program as well as 34MWh of Storage.

4. What solar and battery resources are in the ERCOT interconnection queue with proposed interconnection onto AE transmission or distribution lines?
    1. What is the timing of interconnection for these resources?
    ERCOT does not make specific interconnection requests public.
    2. If these resources are interconnected on schedule, how would those resources affect AE imports, local voltage stability, congestion costs and ability to manage peak load and net peak ramp over the planning horizon?
    It would depend on how the independent power producers operate the batteries, which we will not have control over. It could be beneficial or harmful depending on transmission, power flows and timing of charging and discharging.

5. Does the AE transmission study use the ERCOT load forecasts and resource availability and ELCC assumptions?
The AE Transmission Study used the ERCOT load forecast provided in the Steady State Working Group (SSWG) cases as the base of all scenarios. The high load-growth scenarios included new load requests submitted to Austin Energy that were provided to 1898 & Co. to include in the analysis.
For power flow analysis, 1898 & Co. utilized the ERCOT planning cases that also model relevant generation. 1898 & Co. added additional generators from the queue based on ERCOT's Nodal Protocols. In the scenarios developed, 1898 & Co. modeled renewables based on ERCOT's current assumptions regarding ELCC and included Austin Energy's planned generation retirements.

    1. By how many MW did the ERCOT load forecasts miss actual 2023 summer and winter peak and net peak load levels?

Season	Peak day/interval	Actual Peak Load (MW)	CDR Load Forecast (MW)	Actual - Forecast
Winter 2022-23	12/23/2022 08:00	74,057	64,961	9,096
Summer 2023	8/10/2023 17:30	85,529	82,739	2,790

    2. By how many MW did the AE load forecasts miss actual 2022 and 2023 summer and winter peak and net peak load levels?

Load Condition	Actual Peak	Forecast (Extreme Weather)	Variance (MW)	Variance (%)
2022 Winter Peak MW	2424	2,549	125	4.9%
2022 Summer Peak MW	2953	2,932	-21	-0.7%
2023 Winter Peak MW	2613	2,633	20	0.8%
2023 Summer Peak MW	2987	3,029	42	1.4%

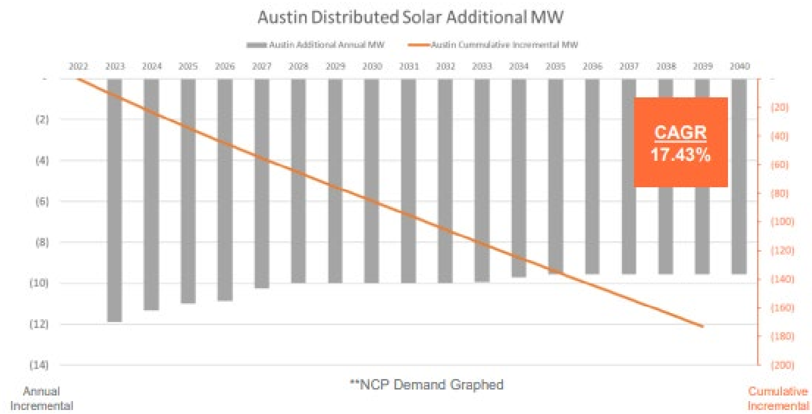
    3. How would significant load under-forecasts affect the accuracy of the AE transmission study findings?
    The Transmission Study included Scenario 4, which considered high load growth for AE along with generation retirements. The retirement of generation increases the import and loading on the lines in the eastern region and weakens the voltage support for the

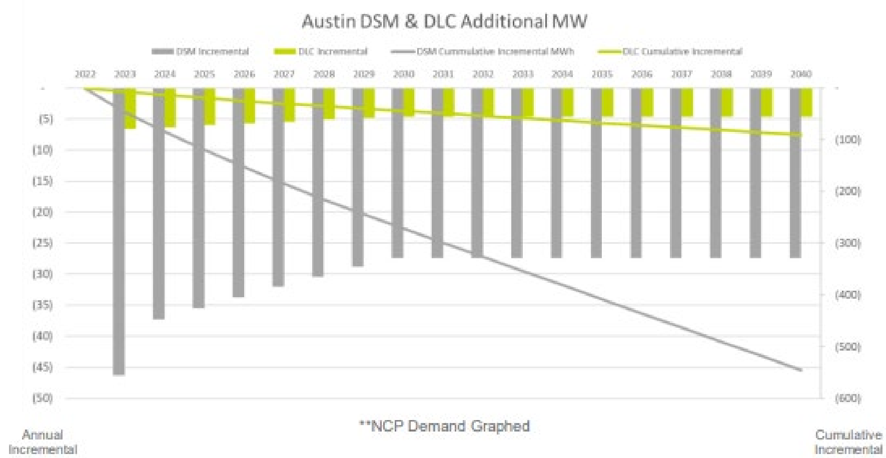
central and western regions. The higher load only exacerbates the issues identified. However, as seen in Scenario 2, even if the load is under what was forecasted the system issues would still exist.

4. Did any of the AE thermal resources have higher-than-expected levels of unplanned outages during winter 2021, winter 2022 or summer 2023? If so, how much higher, and how does this performance change AE's expectations about the costs and timing of continued operation of the affected plants?
   The commercial availability of the thermal fleet has been high over each of those periods, which includes Winter Storm Uri, with most thermal units achieving commercial availability percentages in the high 90s. The most notable outages over those two timeframes have not been forced outages or unplanned outages but extended planned outages on the Sand Hill Combined Cycle for additional repairs found during a planned maintenance outage that affected the months of December 2021 through January 2022 as well as May through June 2023. The costs are factored into variable O&M budgets during budget cycles.
5. How would thermal resource performance under-forecasts affect the accuracy of the AE transmission study findings?
   Need clarification. The Transmission Study scenarios assumed AE thermal generation was retired.

6. How much of the AE forecast load increase is intended to serve crypto mining customers?
   Austin Energy does not make forecasts based on discrete customers. The forecast is based on sector (residential and commercial/industrial) energy models, normalized weather and forecast customer and employment growth. Existing crypto miners would be imbedded in the historical data and may also be imbedded in the forecast customer growth.

7. What are current levels of behind-the-meter solar, batteries and other customer-owned generation across the AE system?
   As of FY22Q3 we were at 120MW of behind the meter solar, 7MW/18MWh of batteries.
   1. What levels of BTM solar, batteries and other customer-owned generation were assumed for future years in the AE transmission study?
      The High EV and DER scenarios were created using system load forecasts and BTM generation. The High EV and DER scenario also assumes high load growth and generation retirement at Decker and Sandhill. The AE system load in this scenario decreased for near-term years from BTM generation, but the increase of EV adoption over the study horizon resulted in a net increase in load seen on the transmission system.





2. Did the AE transmission study assume that BTM solar, batteries, customer-owned generation and behavioral or automated demand response could be used for virtual power plant operation in future years? Please provide details.

   The cases used for reliability assessment assumed the BTM assumptions in the current ERCOT SSWG load assumptions. The Settlement Only Distributed Generation (SODG) included in ERCOT cases are offline for reliability planning. Existing BTM solar, batteries, customer-owned generation and behavioral demand response are part of the load forecasts for peak load. The Transmission Study was a reliability assessment to evaluate boundary conditions; any automated demand response and use of virtual power plant operations were not included as part of this study.

8. Please explain the assumptions made in the AE transmission study with respect to the potential for battery storage as one solution element in future transmission options.
   1. Why did AE and its transmission study consultants conclude that battery storage is not a useful component of future transmission system modifications.

      For the purposes of the Transmission Study, the consultant was considering storage as an option to (at least partially) replace generation at Sand Hill or Decker. Since we would be unable to charge the batteries in certain peak-load circumstances, the consultant concluded batteries were not a resource that met the requirements for the scope of the study. Note: The Transmission Study is a reliability assessment, and this action is consistent with the requirements of these types of studies.

9. What assumptions did the AE transmission study make about how energy efficiency and demand response could affect AE customer loads across the planning horizon?
   AE distribution planners provided details on anticipated load values of new developments that take into account the energy efficiency in new residential and commercial developments, which were factored into load forecasts modeled in power flow. This reliability assessment evaluates boundary conditions; automated demand response was not taken into consideration.
   1. Did the AE transmission study conduct any analysis of whether and how to grow and use targeted energy efficiency, demand response and other measures to create demand flexibility to better manage energy portfolio costs, new transmission, congestion and ancillary services needs? If not, why not?
      Note: The Transmission Study is a reliability assessment in accordance with TPL-001 and ERCOT requirements; it is a transmission needs assessment based on contingency analysis. It does not include energy portfolio costs, congestion costs or ancillary service needs. See the response above for details on how energy efficiency and demand response were included in the Transmission Study.
   2. Is it possible to conduct such a study now?
      Demand Response and other measures that create demand flexibility are viewed as reductions in wholesale load which represents wholesale load cost savings to Austin Energy. Austin Energy studies the demand response technologies and costs and incorporates that cost/benefit analysis in the resource plan modeling. Aggregated demand response could be utilized for some ancillary services, and that is incorporated in the cost/benefit analysis.

10. What are the power engineering benefits and drawbacks of building a new 345kV line to connect the AE system to western power sources?
    The benefit of building a new 345kV line to connect the AE system to western power sources would be improved voltage on the western side of the system. The drawbacks include the challenge of siting and procuring easements on land that is densely populated in some areas.
    1. What are the congestion and redispatch implications of a new western 345kV line for AE and for ERCOT as a whole? What other ERCOT system modifications would this require?
       It would likely reduce the frequency and magnitude of load zone price separation through additional import capacity. Lower load zone prices may reduce the dispatch of natural gas GTs depending on overall ERCOT resource adequacy during periods of high demand.
    2. How might a new western 345kV line affect ERCOT transmission constraints currently causing S. TX wind curtailments and north Texas imports during times of high thermal plant outages?
       It would likely not have a significant impact on the curtailment of south Texas wind. The binding constraints are usually much closer to the wind source with multiple transmission projects currently planned for the impacted area.

11. Is AE planning to act on the recommendations in the Transmission Study?
    Yes.
    1. If so, which of the 9 particular recommendations is Austin Energy pursuing?

Austin Energy is pursuing some aspects of Projects 1-5 and potentially Project 9 (see storage RFP responses above). Ultimately, Austin Energy is pursuing increased import capacity, upgraded lines to increase capacity across the Austin Energy grid, and voltage support given the recent retirements of local generation.

2. What are the power engineering benefits and drawbacks of upgrading or expanding AE's eastern 138kV and 345 kV system? What are the congestion and redispatch implications of such expansions? What other ERCOT system modifications would this require?
   Upgrades will minimize near-term voltage and congestion on the system but may not address long term issues caused by the retirement of generation and increased load growth, especially on the western side of the system. Working on the eastern side may be easier because there is more unoccupied real estate available to expand, which reduces costs and helps in land acquisition. Also, the terrain is relatively flat and dirt (not rock), which helps design and construction. However, obtaining ERCOT approval for planned outages needed for the upgrades in any area will be challenging given limited outage windows, and taking the outages often creates congestion in the short term. Note, upgrading the eastern system also requires upgrades across the system to transport the imported energy to all load.
   While upgrades are ongoing, congestion and redispatch implications may get worse, but after the work is completed, things should improve, at least in the near-term.
   While Austin Energy can upgrade its system to increase import capability, it does not have any control over other entities who own and build transmission in the ERCOT region. Austin Energy upgrades will only benefit the system if there is sufficient capacity to bring electricity to the AE system from generation resources outside the AE Load Zone.
3. Has the engineering and procurement started?
   On some projects, yes. These changes are not only part of the Transmission Study, but several have also been part of Austin Energy's Annual Planning Assessment. They are incorporated into our rolling 5-year Capital Improvement Project (CIP) Budget along with other upgrades to meet the reliability requirements for the Bulk Electric System and the growth needs of Austin.
4. What is the timeline for implementing any of the recommendations found in the Transmission Study?
   This will be an iterative process. As part of the process, changes to the system conditions are evaluated every year and projects are identified to ensure the transmission system remains reliable and compliant with the NERC standards, ERCOT and other regulatory requirements and criteria. Projects and project timing will be determined based on the Annual Assessment completed by Transmission Planning to meet the NERC TPL-001-5.1 standard.

12. Please provide capacity factors for all AE resources for 2020-Aug 2023.
    This information would take a minimum of 3 hours of staff time and potentially much more time to provide a response. If the information is of particularly high value to your team's efforts moving forward, please let us know and we can discuss further.

13. Please provide 2022 and 2023 energy use by customer class.
    Final numbers for 2023 are not available at this time.

CUSTOMER CLASS	2022
Residential	5,171,765,527
Commercial	5,040,557,201
Industrial	3,376,110,095
Public Street & Highway	57,693,274
Gov't Authorities	694,323,875
Total kWh Sales	14,340,449,972

14. Please provide an updated greenhouse gas inventory, by unit/source.
   Please see Question 19 for this data in graphical format. The underlying data is in the table below. Note that emissions by unit is also available via the US EPA's publicly available website for most power plants in the US.

Emissions of CO2 by calendar year in metric tonnes

	Decker	Sand Hill	FPP (AE share)
CY2018	572,000	802,000	3,979,000
CY2019	455,000	677,000	3,287,000
CY2020	464,000	689,000	3,324,000
CY2021	450,000	623,000	3,348,000
CY2022	84,000	731,000	2,710,000

15. A number of new environmental regulations proposed by the Biden Administration have the potential to impact operations of the Fayette Coal Plant, including the Mercury and Toxics MACT standards, the Good Neighbor Rule, the GHG rule, Regional Haze requirements, and CCR rules on coal ash.
    1. Has Austin Energy conducted any analysis of how these rules could impact Fayette operations or cost?
       No analysis has been conducted; however, many of the environmental regulations threaten the ability for FPP and other coal plants to continue operating in future years.
    2. If so please provide any analysis of the impact of these rules on Fayette.
       N/A

16. Has Austin Energy considered converting one or more units of the Fayette Coal Plant to use a synchronous condenser to provide local voltage support to the grid?
    No, we're not currently considering it.
    1. If so, please provide any analysis conducted by Austin Energy on the feasibility of converting the plant to use as a synchronous condenser.

FPP is not located in Austin Energy's load zone, and voltage support is a localized characteristic of the Bulk Electric System. Voltage support at FPP would not fill the need within the AE grid.

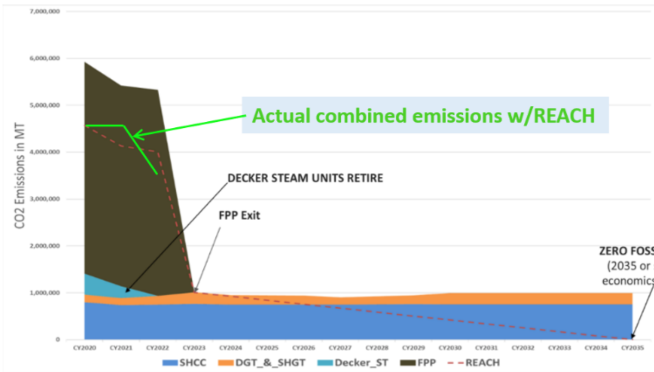
2. If not, is this an option worth investigating?
N/A, see above.
3. Is conversion to a synchronous condenser a viable and appropriate option for either the Sandhill or Decker plants? Why or why not?
Yes, at Decker Austin Energy has already converted one unit operation into a double mode of operation. The unit can be started, connected to the grid, and then it becomes a motor when the fuel is turned off. It has the ability to go back into generating mode when the fuel is turned back on. This is because the units have a free spinning compressor. The Sand Hill units do not have this capability.

17. What distribution system modifications will be required to meet AE's projections of population-based customer load growth, additional electrification demand (including EV adoption), and additional BTM resources? To what degree could these distribution system needs affect AE's transmission and resource plans through 2035.
The addition of new substations, unit transformers, or upgrades to existing distribution infrastructure, such as reconductors, will be needed to meet the load growth in areas with limited capacity or with equipment reaching or exceeding their normal rating.

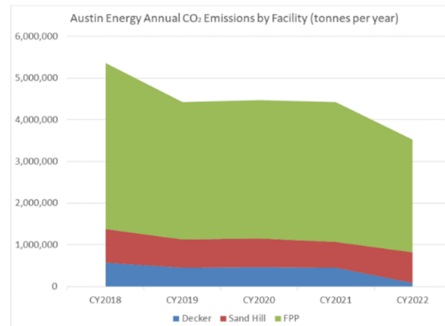
18. For the previously provided renewable energy generation and load information, please explain what "total wind w/ trade" means and how it's different from "total wind". And is "net load" the total load, or is something being subtracted from the total load to get "net load"?
Austin Energy is not the QSE (Qualified Scheduling Entity) for two of the wind farms in its portfolio. Those two wind farms have data captured in a different table in the database than the wind farms for which AE is the QSE. Total wind w/trade includes both those two wind farms along with the wind farms for which AE is the QSE, so that is the total wind in AE's portfolio.

19. Can AE please provide the graph on page 8 of the current Resource Plan with a line showing the actual emissions? A new projection would also be appreciated. https://austinenergy.com/-/media/project/websites/austinenergy/energy-efficiency/gen-res-climate-prot-plan-2030.pdf?sc_lang=en&hash=2EF7A06FEA6E01E7789FBADBD5C427D9
The following charts show actual emissions (right chart) from calendar year 2018-2022 and an emissions line over the original projections for CY2020-22 (left chart). Austin Energy typically does not release partial year emissions because the full year total is not completely certified by EPA until January of the following year.

Actual Emissions superimposed over the original Resource Plan projection



Actual emissions by plant by year



Austin Energy Generation Emissions Projections in Metric Tonnes (MT)																
	CY2020	CY2021	CY2022	CY2023	CY2024	CY2025	CY2026	CY2027	CY2028	CY2029	CY2030	CY2031	CY2032	CY2033	CY2034	CY2035
Current Goals	5,928,016	5,419,359	5,328,741	1,011,916	952,147	945,250	940,819	905,102	923,256	946,587	994,288	994,288	994,288	994,288	994,288	994,288
REACH	4,570,050	4,133,072	4,008,219	1,011,274	927,001	842,729	758,456	674,183	589,910	505,637	421,364	337,091	252,819	168,546	84,273	0

*These are projections as of March 2020 and actual results for a given period may differ depending upon market conditions.

20. Please provide all emissions data for AE's portion of Fayette for 2020 through August 2023. (NOTE: 50% of the total isn't accurate because of REACH.)
    Please see data provided in response to Questions 14 and 19 for years 2020-2022.