Electric Utility Commission Resource Planning Working Group Meeting
Date: February 13, 2020
Time: 4:00 pm – 6:00 pm
Location: Town Lake Center, Room 100

Safety Moment (5 minutes)
Transmission Study (25 min)
Voice of the Customer (30 minutes)
DNV Preliminary Report (30 minutes)
REACH (30 minutes)
Questions & Answers – Regarding AE Working Group Scenarios 1-9

1. What are the key factors related to each Green-Yellow-Red assessment?

The assessment was based on the resource planning objectives and risks each scenario presents long term. Key factors are included, but not limited to:

- Hedging against costly price events
- Transmission limitations in Austin service territory
- Price separation in Austin service territory
- Alignment with COA 2019 Climate Emergency resolution
- Alignment with AE’s 2017 Resource Generation Plan
- Intermittent price risks
- Fuel diversity
- Availability of parts
- Regulatory uncertainty
- Congestion risks
- Ramp issues
- Carbon offsets verification issues
- RECs without energy do not provide additionally
- 2020 – 2024 ERCOT reserve margins
- Potential for renewable fuels

a. Under Rate Stability/Affordability, is that directly related to the reported results of System Rate Ranges, or are there additional factors?

System Rate Ranges are a portion of the Rate Stability / Affordability ranking which also includes other factors listed above due to forecast model limitations due to the weather driven nature of the supply mix in ERCOT.

b. Under Carbon Reduction, please give the modeled carbon reduction total for each scenario.


c. Under Flexibility/Risk Protection, we’ve briefly discussed transmission, storage and summertime peak prices as key risks. Are there other factors you’ve included? Would you provide a relative contribution for each as it relates to each scenario?
Price spikes and negative prices occur throughout the entire year, not only in the summer. The first time we hit the $9,000 price cap in ERCOT was January 23, 2018 for a duration of about ten minutes. As intermittent resources grow in the supply stack and the expectation that resources will be available which then are not causes ramping issues especially during tight conditions, for example cold winter mornings.

d. Would scenarios #1, #2 and #5 improve when transmission constraints are resolved?
   Improvement depends on future demand growth, technology changes, and future market design.

e. Which scenarios would benefit most when storage becomes realistic in terms of both battery cost and better defined ERCOT applicability and market pricing?
   Future ERCOT market design on battery storage is needed to provide the insight on the benefits of this emerging technology.

2. Please provide the range of the 20-year Net-Present-Value of the 10 modeled scenarios and compare those against the two percent affordability goals. Due to the weather dependent nature of this market, the NPV values do not reflect the risk to affordability our customers are exposed to.

Questions Regarding AE REACH Scenario

1. Please show calculations of how the carbon adder works in practice. Does it start from a carbon or affordability goal? How does it relate mathematically to the difference between AE generation source carbon intensity and ERCOT average? How does it change in response to carbon improvements in AE and/or ERCOT? Please give detailed examples of each.
   The proposed scenario REACH, would start with a carbon price that would yield a 30% decline in CO2 emissions out of the Fayette Power Project while maintaining a 2% affordability goal in respect to the Power Supply Adjustment portion of a customer’s bill. After Austin Energy exits the Fayette Power Project, the carbon price would be adjusted upwards to achieve a reduction in Austin Energy’s natural gas generations’ CO2 emissions while being mindful of affordability goals and measures. Examples in February 13, 2020 presentation, slide titled “Carbon Dispatch Example”

2. What is the cost of higher carbon reductions during the FPP ramp down phase in 2020-2022, i.e., 40, 50 or 66%?
Based on current 2020 base price forecasts from fundamental models, the higher percentages of carbon reductions from the Fayette Power Project between now and the planned exit from the project would result in PSA increases greater than the 2% affordability goal. Actual carbon reduction costs will be dependent on realized market conditions.

3. **How will the carbon reductions due to the carbon adder be measured, verified and reported?**
   Austin Energy is proposing to report, on an annual basis, the difference in carbon emissions from the base forecast and to attribute how much of the difference is due to the carbon dispatch adder, model to market differences and unplanned or forced outages.

4. **Under the model, would the Decker peakers run the least and close earliest after the retirement of FPP due to their relative carbon intensity?**
   The Decker peaking units are the least efficient natural gas unit in Austin Energy’s fleet and emit the highest amount of CO2 per MWH after the Fayette Power Project so it would be reasonable to assume that the Decker peaking units would run the least and close the earliest of the remaining natural gas assets after Austin Energy’s exit from the Fayette Power Project.

5. **Will Austin Energy commit to closing some gas plants earlier than 2035 in their REACH scenario if they were found to be too expensive to run, and/or there was technology like demand response and storage available to cover the capacity benefits of the gas plants?**
   Austin Energy will retire any owned asset that is found too expensive to run and no longer provides a benefit to our customers and community. The very intent of the REACH scenario is to reduce Austin Energy’s reliance on natural gas generation while protecting customer’s rates to allow for emerging technologies continue to mature and become economically viable solutions in the ERCOT wholesale market.

6. **What are ERCOT reserve margins forecast from now to 2035 and will they improve or increase risk of peak shortages, as they are best understood at present?**
   ERCOT currently reports summer reserve margins out through 2024. The ERCOT forecasted reserve margin shows increase through 2022 before the reserve margin begins to decline into 2023 and continues through 2024 back down to below a 13% figure. Reserve margin forecasts are based on forecasted demand and the projects that are currently in the queue. Based on history, some of those projects may not come to fruition and depending on realized market prices, some assets not contemplated or announced to retire, may retire due to changing economics.
7. **How will we account for the upstream emissions of fracking and gas distribution in ranking the carbon intensity of natural gas?**

   Energy consumers are currently unable to discern between conventionally sourced and fracked natural gas as there is currently no mechanism to do so on natural gas “inter” and “intra” state transportation pipelines. Austin Energy receives measurements of the natural gas quality at the power plant source but cannot account for or measure the quality by which the natural gas was produced.

8. **Could this model be used by other municipal or private utilities as a method to accelerate their transition to renewables while constraining risks?**

   Yes, Austin Energy believes that this model could be used in lieu of a formal cap & trade program to help other municipal and private utilities voluntarily reduce CO2 emissions in an efficient and more cost effective way than a number of other types of reduction CO2 reduction policies.

**Questions about AE Transmission Study**

1. **What are the policy objectives, goals and timelines of the transmission study? When will it be reported to EUC and AEUOC?**

   The transmission study will evaluate transmission changes needed to support the closure of AE Plants under the following Scenarios:
   - Scenario 1: CF_2027 – Carbon Free 2027
   - Scenario 2: CF_2030 – Carbon Free 2030
   - Scenario 3: CF_2035 – Carbon Free 2035
   - Scenario 5: Gas_Phase_Out_2027_CF_2030 – Close SHCC 2027, Close GT’s 2030

   Status reports will be provided during the study and the results will be reported to the EUC when the study is completed. The estimated completion dates will be based on responses to the Request for Proposals (see question 3).

2. **Is there a prior and/or ongoing study series to provide a baseline?**

   The Transmission Study contemplates scenarios that include full shutdown of AE Plants. There is no prior study to use as a baseline.

3. **Will outside consultants be needed for this work? If so, what is the estimated cost?**

   Yes, outside consultants will be needed. An RFP (Request for Proposals) will be assembled and sent out to qualified companies for bid. The bid process will follow the procurement process for the City of Austin and Austin Energy. The estimated
costs of the Transmission Study are not known at this time and will be based on bid responses combined with internal labor and other relevant expenses.

4. Will the study identify the work needed to support closing the remaining gas peakers at Decker and the CC plant and peakers at Sand Hill by importing sufficient renewable energy to reliably replace them?
   The Transmission Study will identify transmission construction and modifications that are needed to support closure of the Plants and the import of sufficient energy to power the Austin Energy service area. The Study focuses on physical changes to the transmission system. The type(s) of energy brought into the area served by Austin Energy would not be part of this Study.

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7. Will the study accommodate growing community, commercial and residential solar within the AE load zone to a level to be agreed in the 2030 Generation Resource Plan?
   The Study will address the impact of different load reductions that might be achieved from Solar within the AE Load Zone.

8. Will the study accommodate higher Demand Response/Efficiency goals to an agreed goal of the 2030 Generation Resource Plan?
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10. Will the addition of utility scale batteries at Decker and/or Sand Hill be considered as a solution to mitigate transmission constraints?
The Study will address the impact of different load reductions that might be achieved from Utility Scale Batteries within the AE Load Zone. However, current rules and regulations do not accommodate Utility Scale Batteries being deployed in lieu of transmission infrastructure.

Questions Regarding Future AE Gen Plan Working Group Functions

1. Will we commit to a new Working Group in 2022 to update of the Resource, Generation and Climate Protection Plan after the critical results of the transmission study have been completed, ERCOT has defined appropriate usage and markets for battery applications, U.S. near-term political will and policies for solving the climate crisis are better understood and updated cost forecasts for all energy and storage technologies are available?
There is not a Resource Generation Planning Working Group in 2022 scheduled. Resource Generation and Climate Protection Plans are stipulated to occur every five years as prescribed by the 2017 Generation Resource Plan. “Conduct resource plan updates in advance of cost of service studies every five years, unless significant changes in technology or market conditions warrant more frequent updates.” This resource planning process began in 2019 for a 2020 delivery in order to comply with aforementioned directive. The next Resource Generation Planning process is scheduled for 2024 kick off and 2025 delivery.

2. Will we commit to forming the 2022 Working Group with an added effort to balance racial and economic diversity along with representing customer types and environmental concerns within the group in an open process?
In addition to the answer above, the planning process can balance racial and economic diversity along with representing customer types and environmental concerns within the group in an open process when the next process occurs.

3. How will this Working Group conclude its recommendations and present to EUC and AEUOC?
The Generation Resource and Climate Protection Plan anticipated taking resolution to City Council by Q1 2020. A joint meeting between EUC and RMC is scheduled March 9th. Austin Energy will seek City Council approval March 26th, 2020.
Bill Impact due to Extreme Pricing Events:

Janee
I understand why you have flexibility/risk protection as a third category, but it is directly tied to affordability. If possible, please show the information you have on slide 24 in dollars and cents, as well as percentage increase, at a couple of different usage levels. Please include examples in the different customer classes, including Houses of Worship.

Leo
I think it would help to clarify the risk conversation is some sort of sensitivity evaluation on the model output. As I understand the slides of the expected system rate is based on standard conditions/input into the model. I tried to think through what we could do to highlight the impact of the uncertainty on the range of rates. I think the sensitivity is somewhat illustrated by the market versus forecast curve shown on slide 20. Additionally, slide 24 highlights the impact of an extreme event on the PSA, but I think it would be helpful to understand the impact on the systematic rate for the various scenarios. The system rate ranges for each scenario would reflect the risk if the impact of an extreme event could be modelled.

See February 13, 2020 Presentation “Affordable Carbon Reduction”, slide titled “Rate Impact”

System Rate Ranges:

Al
The scenarios show a range of rates. I assume they are the range of ‘retail’ customer rates at the end of the study. I have written notes that it was 2040, but that doesn’t make sense. Is it 2035 or 2030. 2035 makes most sense with the 2% escalator. What is the right answer?

Todd
I would like to request a table of rates by calendar year from 2017 through the term of the economic model for each of the scenarios. For years 2017-2019 please use the actual system rate averages. For the projection years by scenario please provide a high/low and average expectation by year of each of the scenarios in a data table. I doubt there will be an effective approach to display graphically so a data table in Excel will suffice.
I also believe in conversation during the meeting that the chart that shows system rate average ranges are representing the ranges for CY2027. Please confirm what the System Rate Average (cents/KWH) is representing in the table provided.

System Rate Ranges presented in the January 30, 2020 presentation which are not inclusive of extreme pricing events as ones experienced summer 2019 represent the possibility of the lowest and highest rates between 2027 and 2040 knowing that these ranges do not contain the probabilities of where rates may be given the evolution in the ERCOT market today and over the next two decades.

REACH:

Todd
Please also share the reasoning behind the increased dispatch costs associated with reduced carbon REACH dispatch prices. Will this new dispatch point result in an increase to the customer up to the affordability cap? What would this look like if the affordability cap was limited to 2% annually from CY2020 rates?

See February 13, 2020 Presentation “Affordable Carbon Reduction”, slide titled “Carbon Dispatch Example”.

Miscellaneous:

Cyrus
Austin Energy to please provide the list of current fossil fuel units, their first year of operation, their recent capacity factors (overall use), and basic data on actual emissions of both CO2 and criteria pollutants (NOx, PM, SO2, etc.).

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Commercial Operation Date</th>
<th>2018 rate (lbs. CO2/Net MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decker 1</td>
<td>1971</td>
<td>1,337</td>
</tr>
<tr>
<td>Decker 2</td>
<td>1978</td>
<td>1,414</td>
</tr>
<tr>
<td>Decker GT1</td>
<td>1989</td>
<td>1,851</td>
</tr>
<tr>
<td>Decker GT2</td>
<td>1989</td>
<td>1,759</td>
</tr>
<tr>
<td>Decker GT3</td>
<td>1989</td>
<td>1,831</td>
</tr>
<tr>
<td>Decker GT4</td>
<td>1989</td>
<td>1,830</td>
</tr>
<tr>
<td>SHEC 1</td>
<td>2001</td>
<td>1,198</td>
</tr>
<tr>
<td>SHEC 2</td>
<td>2001</td>
<td>1,186</td>
</tr>
<tr>
<td>SHEC 3</td>
<td>2001</td>
<td>1,164</td>
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<tr>
<td>SHEC 4</td>
<td>2001</td>
<td>1,158</td>
</tr>
<tr>
<td>SHEC 5</td>
<td>2004</td>
<td>934</td>
</tr>
</tbody>
</table>
Janee
Is there any preemptive state law or other legal impediment to AE offering a DSM, DR or Solar rebate program that is limited to customers with household incomes under a specific level?

All customers pay the Energy Efficiency Services portion of the Community Benefits Charge. This recovers the cost of energy efficiency rebates and related costs, solar incentives, and the Green Building program offered by Austin Energy throughout its service territory. The requirement for the use of public funds in payment of rebates and incentives is the accomplishment of a public purpose. That public purpose is served through achieving reductions in peak energy demand that would not have occurred without the incentives. Adding an income requirement would require in-depth legal analysis. The legal implications of any program or eligibility requirements are highly dependent upon the specific details of that program. Austin Energy is committed to an increased focus on equity in all of its programs and will examine this and other issues moving forward in developing program enhancements.

Also, I am interested to know if AE saw an increase in the number of calls to the call center and/or arrearages after the August/September bill increases.

We saw no increases in arrearages Sept-Dec, other than expected/standard seasonality effects. As anticipated, our total arrearages for those months decreased over same months/prior year.
Questions for DNV GL

Responses to Working Group Policy Questions

1. In your analysis of the Austin Energy white paper, you adjusted their “Best” scenario of reaching 1350 cumulative MWs by 2029 by creating a cap on the SPUR program of 3 MWs per year and also reducing multi-family savings by some 39.51 MWs over the 10 year period, suggesting that the “Best” scenario would be about 1300 MWs by 2029. Is that a correct assessment of the adjustments you made to the Austin Energy “Best” scenario?

   ANSWER:
   SPUR is currently under contract review so final numbers are not known at this time. The final MW savings for 2029 will not be known until the completion of the current benchmarking project underway with DNV GL. There is much more that goes into the final calculation than multifamily and SPUR. Currently, these programs are only two of many program across EES and GB that contribute to the whole.

2. It appears that DNV did not assess Austin Energy’s expected MWs that it could obtain through ERCOT’s ERS program. Is that because these are separate contracts with ERCOT independent of Austin Energy budgets? Should the ERS program be considered in the overall Austin Energy goal?

   ANSWER:
   Participation in ERS is currently an unknown quantity. Events are under the control of ERCOT. Events are called in emergency situations as determined by ERCOT. The last events were called in 2011 and 2019 so savings is not a consistent commodity. Savings will be included in the overall tracking but cannot be part of the overall goal as the participation and number of possible events are unknown.

3. While your initial study suggested that it might be difficult to achieve the “Best” scenario of 1350 MWs (or 1300 MWs as adjusted), and that the “Business-as-Usual” scenario would be achievable, it does not appear that DNV provided an assessment on the “Better” Scenario of achieving 1200 MWs by 2029. Does DNV believe that the “better” scenario is achievable, and if so, did you assess Austin Energy’s expected budgets and staff levels to achieve a “better” scenario?
**ANSWER:**
DNV GL’s response to AE’s white paper included a basic analysis indicating that in order to achieve savings above “business as usual”, budgets would need to be increased. These budget increases would include rebates/incentives, staff and O&M resources. Budgets are directly related to the portfolio of program offerings and the set MW savings goals. Programs requiring more education and outreach and focused on the hard-to-reach population will require increases budgets to reach goals and achieve success.

Please find below a chart put together by TCEQ on the “better” scenario. Estimate of budgets, based on the estimates of savings.

<table>
<thead>
<tr>
<th>Year</th>
<th>Best MW</th>
<th>Best Budget</th>
<th>Better MW</th>
<th>Better Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY20</td>
<td>860</td>
<td>$16,510,384</td>
<td>860</td>
<td>$16,510,384</td>
</tr>
<tr>
<td>FY21</td>
<td>929</td>
<td>$18,429,382</td>
<td>908</td>
<td>$18,012,787</td>
</tr>
<tr>
<td>FY22</td>
<td>990</td>
<td>$20,369,215</td>
<td>950</td>
<td>$19,546,216</td>
</tr>
<tr>
<td>FY23</td>
<td>1048</td>
<td>$22,322,878</td>
<td>990</td>
<td>$21,087,452</td>
</tr>
<tr>
<td>FY24</td>
<td>1103</td>
<td>$23,550,336</td>
<td>1028</td>
<td>$21,948,998</td>
</tr>
<tr>
<td>FY25</td>
<td>1154</td>
<td>$25,120,790</td>
<td>1063</td>
<td>$23,139,861</td>
</tr>
<tr>
<td>FY26</td>
<td>1205</td>
<td>$26,102,076</td>
<td>1098</td>
<td>$23,784,298</td>
</tr>
<tr>
<td>FY27</td>
<td>1254</td>
<td>$27,332,277</td>
<td>1132</td>
<td>$24,673,156</td>
</tr>
<tr>
<td>FY28</td>
<td>1303</td>
<td>$28,680,342</td>
<td>1166</td>
<td>$25,664,834</td>
</tr>
<tr>
<td>FY29</td>
<td>1350</td>
<td>$30,292,704</td>
<td>1200</td>
<td>$26,926,848</td>
</tr>
</tbody>
</table>

4. Based upon your initial analysis, do you believe a goal of 1,250 MWs by 2030 is achievable with incentive levels such as those found above?

**ANSWER:**
DNV GL does not believe the numbers provided by TCEQ would allow for the achievement of the requested goals. The rebate budgets in the TCEQ table are less than what are the actuals for FY2020. Initial analysis indicates that budgets will need to be increased in both rebates/incentives and O&M to achieve the MW goals.

5. Your analysis mentions the need for Austin Energy to pilot or explore new programs that look at new technologies like the use of EV, EV Charging stations and Energy Storage through incentives to help achieve demand reduction goals. Did you do any assessment of what such programs could achieve in terms of demand or energy savings in Austin Energy’s service territory?

**ANSWER:**
Initial load shape analysis shows a shift in EV load with EV rates. This does not allow for demand shifting during peak rates. There is currently not enough information or distribution within the service territory of energy storage to know the impact on demand or energy savings.
6. Did you assess whether you thought Austin Energy could achieve a certain number of MWs of demand response by a certain date? Do you think that achieving 200 MWs of DR by 2025 -- as Austin Energy contemplates under both the Better and Best models - is achievable? Would achieving this amount be reliant on an ERCOT program like ERS?

**ANSWER:** Yes, DNV GL believes that 200 MW of DR is achievable by 2025 under the Better and Best models. However, these two models both need budget increases to be achievable.

6a. Is 250 MWs of demand response by 2030 achievable in your view?

**ANSWER:**
While the final study is not complete at this time, there are scenarios in which 250 MWs of DR might be achievable. However, these scenarios require increased budgets.

**Technical questions:**

The questions below appear to be directly related to the work that is currently underway by DNV GL and not the paper they submitted to the working group earlier.

These questions cannot be answered at this time as the project is currently ongoing and is not complete at the time of this response.

The answers below are based on an incomplete analysis and report and may change with the completion of the report and analysis.

**What avoided cost of energy projection is being used in DNV GL’s analysis?**

**ANSWER:**
This may be answered within the upcoming report.

**Does DNV GL’s assumptions regarding incentive or rebate levels recognize the higher ERCOT wholesale energy prices realized in 2019?**

**ANSWER:**
This may be answered within the upcoming report.

**Are the higher recent wholesale energy prices in ERCOT reflected in DNV GL’s program cost effectiveness analysis?**

**ANSWER:**
This may be answered within the upcoming report.
What assumptions have been made regarding the number, duration, and level of wholesale market price spikes in future years that AE’s DR programs may be able to address?

**ANSWER:**
This may be answered within the upcoming report.

Does DNV GL’s analysis include an avoided cost of capacity as a program benefit? If so, what is the basis of that estimate? That is, what type of plant is it? What is the source of the cost estimate?

**ANSWER:**
This may be answered within the upcoming report.
Transmission System Study for Generation Retirement Scenarios

Thomas Pierpoint
VP, Electric System Engineering & Technical Services

Reza Ebrahimian
Director, Engineering & Technical Services

To safely deliver clean, affordable, reliable energy and excellent customer service

February 12, 2020
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Agenda

• Answers to Questions from EUC Generation Resource Planning Working Group
• Regulatory Requirements for Transmission Planning
• Risks of Removing Internal Generation and Possible Mitigations
• Variables that might impact the Study
Questions and Answers

1. What are the policy objectives, goals and timelines of the transmission study? When will it be reported to the EUC Generation Resource Planning Working Group?

The Study will evaluate transmission changes needed to support the closure of AE Plants under the following Scenarios:

- Scenario 1: CF_2027 – Carbon Free 2027
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Status reports will be provided during the study and the results will be reported to the EUC when the study is completed. The estimated completion dates will be based on responses to the Request for Proposals (please see question 3)
2. Is there a prior and/or ongoing study series to provide a baseline?

The Transmission Study contemplates scenarios that include full shutdown of AE Plants. There is no prior study to use as a baseline.

3. Will outside consultants be needed for this work? If so, what is the estimated cost?

Yes, outside consultants will be needed. An RFP (Request for Proposal) will be assembled and sent out to qualified companies for bid. The bid process will follow the procurement process for the City of Austin and Austin Energy. The estimated costs of the Transmission Study are not known at this time and will be based on bid responses combined with internal labor and other relevant expenses.
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Questions and Answers (continued)

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Risks & Mitigation of Removing Internal Generation
*Risks need to be Identified and Mitigated*

**Risk – Loss of Flexibility to Control Transmission Congestion**
- Austin Energy and its Customers can be required to absorb large costs during congestion periods

**Risk – Loss of Flexibility to Control Transmission Overloads and Voltage Problems**
- Local Generation can allow redirecting power to unload a transmission system element
- Local Generation allows more voltage control capabilities
- Local Generation can prevent voltage instability and voltage collapse

**Mitigation – Careful Planning and Construction of Transmission System improvements can help to Reduce Risks**
- Planning and building transmission systems in strategic locations at higher voltages can serve to reduce these risks
Regulatory Requirements for Transmission Planning

All Regulatory laws, rules and guidelines must be followed during this process

- Market Participants in the ERCOT region are subject to both state and federal laws and regulations.
- Market Participants that own or operate facilities that are part of the Bulk Electric System, as defined in federal law, are subject to oversight by the:
  - Federal Energy Regulatory Commission (FERC),
  - North American Electric Reliability Corporation (NERC), and
  - Texas Reliability Entity, Inc. (Texas RE)
- All ERCOT Market Participants are subject to oversight by the Public Utility Commission of Texas (PUCT).
Regulatory Requirements for Transmission Planning (con’t)

All Regulatory laws, rules and guidelines must be followed during this process

NERC Standards, Including TPL-001-4

• “Establish Transmission system planning performance requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies”
• Violations include fines up to $1M per violation per day

ERCOT Binding Documents, including ERCOT Nodal Protocols and Planning Guide

• “The Protocols outline the procedures and processes used by ERCOT and Market Participants for the orderly functioning of the ERCOT system and nodal market”
• Violations include fines up to $100,000 per violation per day

Austin Energy Transmission Planning Criteria

• Developed to address our customers demands and ensure compliance with NERC and ERCOT requirements, considering the characteristics of Austin Energy’s transmission system
Transmission Projects over $25M Must be Approved by ERCOT RPG Workgroup and ERCOT

- Currently this approval process takes an average of 10 months or more
- ERCOT RPG (Regional Planning Group) and ERCOT can propose modifications

New PUCT CCN Approval Requirement

- New PUCT rule requires all MOUs, including Austin Energy to obtain CCN (Certificate of Convenience and Necessity) from PUCT on projects outside of the city limits
- For an average size project it could take up to two years to obtain CCN
- The CCN process can lead to prolonged litigations and selection of alternatives
Variables that might impact the Study

Changes in the ERCOT Transmission System
• The ERCOT transmission system surrounding AE is constantly changing. Projects must be adjusted accordingly

Cannot control decisions with nearby Plants owned by other Entities
• Sim Gideon (608MW), Lost Pines (511MW), Ferguson (540MW), Winchester (176MW)

Need to adhere to Various Regulatory Requirements
• Need to be careful about Study versus Intent (implied or not)
What Austin Energy Customers Want

A Review of Research

Customer Energy Solutions & Corporate Communications

February, 2020

© 2018 Austin Energy
Our Customers
Who Are Our Customers?

Residential Customers
- 90% of total customers, 40% of revenue
- > 60% rent
- many < age 33
Average bill is second lowest in state

Commercial & Industrial
- 10% of customers
- 60% of revenue
- > 85% rent

2019 Revenue $MM
Urban Environment Transition

Multi-family homes are becoming more prevalent in Austin

FY 2009 Housing Mix
- Single-family, 52.2%
- Multi-family, 47.8%

FY 2018 Housing Mix
- Single-family, 49.1%
- Multi-family, 50.9%
Declining Consumption per Customer

20% of new residential construction is Green Building

40% of new commercial construction is Green Building
Trend in Residential Consumption

All homes are becoming more energy efficient

All Residences

Overall, 842 kWh

Single Family

Overall, 1084 kWh

Multi-Family

Overall, 609 kWh

Average consumption per bill
Tiered Rates and Revenue Stability

- 5-tiered residential block structure created in 2013 set the rates for tiers 1 and 2 below cost of service with tiers 4 and 5 significantly above cost.
- Consumption in tiers 4 and 5 have decreased 14% over time.
- Declining average consumption aggregates energy sales into the lower tiers jeopardizing Austin Energy’s ability to recover costs.

**FY2021 Residential Tier Distribution**

- 76% of sales, 61% of revenue below cost
- 12% of sales, 21% of revenue above cost

<table>
<thead>
<tr>
<th>Tier</th>
<th>kWh %</th>
<th>Energy Charge Revenue %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>Tier 2</td>
<td>31%</td>
<td>26%</td>
</tr>
<tr>
<td>Tier 3</td>
<td>18%</td>
<td>12%</td>
</tr>
<tr>
<td>Tier 4</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td>Tier 5</td>
<td>7%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Our Customers Want

- Choice
- Control
- Reliability
- Convenience
- Low Cost
Striking a Balance: Customer Preferences/Stakeholder Goals

City Council
2 Commissions & 1 Committee
Working groups
Solar Austin and Public Citizen
Sierra Club
Low income advocates
CCARE (large customers)
Other advocates

>2 dozen programs - National recognition

900 MW conservation & peak shift by 2025

1% annual savings

200 MW local solar by 2025 - 61% complete, at least 100 MW customer sited
30% of solar customers are CAP
Incentive ramp down/change
Hard to reach markets

Funding goals, including low income
Electric vehicle goals
Storage goals
Research
2012 - 2019
Customer Experience Surveys

Benchmarking
• JD Power (JDP) – Residential
• JDP – Commercial
• E Source – Key Accounts
• E Source – Small/Mid Commercial
• MSI – Residential

Gap Analysis
• Voice of the Customer (VOC) – Residential
• Voice of the Customer – Commercial
Examples of Research Projects

• 2012 Solar Stakeholder Survey
• 2014 Customer Assistance Resource Survey
• 2015 Commercial Rate Survey
• 2016 Resource Generation and Climate Protection Survey
• 2018 Weatherization Survey
• 2018 Nonprofit & Solar Survey
• 2018 Panel Research
• 2019 Solar Bill Survey
• 2019 GreenChoice Survey
• Continuously fielded customer experience and transaction studies
Savings
Money & Energy

Low Cost
Control
Customers report wanting to save money and energy

- **2018 Nonprofit & Solar Project**
  - Nearly 100% of the respondents reported the importance of maintaining low rates

- **2018 Panel Project**
  - 71% want information on how to reduce energy and utility bill
  - 48% would be more satisfied with Austin Energy if rates were lower

- **2018 Weatherization Project**
  - 79% would not have weatherized their home without assistance
  - 99% reported the importance of customer assistance

- **Customer Experience Surveys**
  - Year over year improvements
  - Largest gaps in low price awareness
Renewables
Local & Portfolio Mix

Choice

Reliability
Customers report interest in renewables

• **2012 Solar Stakeholder Project**
  - Majority support the idea of eventually eliminating residential rebates
  - Majority support the idea of community solar
  - Majority believe value of solar rate should be available to all customers

• **2014 Customer Assistance Resource Project**
  - 65% of respondents chose an overall renewable percentage between 36% and 50%

• **2016 Resource Generation and Climate Protection Project**
  - 80% want the use of renewable fuels

• **2018 Panel Project**
  - 66% report renewable energy is important to them as an individual
  - 63% report renewable are important to the community

• **2018 Nonprofit Agency & Solar Project**
  - Over half support the importance of providing renewable energy to customers
Renewables & Savings
Customer Bill Impacts

Low Cost
Choice
Control
Customers report a lack of willingness to pay more for renewables

• As more than one customer has been quoted – “Why should we pay for these when the sun and the wind are free?”

• **2014 Customer Assistance Resource Project**
  • 63% reported they would be *unlikely* to purchase wind energy
  • 63% reported they would be *unlikely* to purchase solar energy

• **2015 Commercial Rate Project**
  • Majority stated that paying more for energy than was necessary was *bad* for their bottom line

• **2016 Resource Generation and Climate Protection Project**
  • 74% reported willingness to pay *less than $5 per month* more for renewables
  • 34% are willing to increase electric rates over the next 3-5 years to increase renewables in the portfolio
Customers report a lack of willingness to pay more for renewables

- **2018 Nonprofit Agency & Solar Project**
  - Nearly 100% reported the importance of maintaining low rates
  - More social service agencies (nearly 2 to 1) support low rates over renewable energy

- **2019 Solar Bill Project**
  - Majority reported the primary benefit of solar panels was to reduce utility bills

- **2019 GreenChoice Project**
  - 67% will not continue GreenChoice subscription due to price of GreenChoice
    - Cost was the biggest driver when deciding to participate
  - 63% want renewables from a mix of wind and solar
    - 37% have no preference in source
  - 38% do not participate due to price
  - 38% do not participate due to limited benefits related to additional cost
Summary

• Energy efficiency measures and building codes have helped reduce overall usage (thus cost) for customers
• Customer favor renewable energy but are not always in favor of the additional costs of solar and wind energy
• While renewables in the portfolio mix are important, saving money is a higher priority for customers
Affordable Carbon Reduction

Reduce Emissions Affordably for Climate Health

Resource Planning Objectives

- Carbon Reduction
- Affordability
- Flexibility
Carbon Reduction

Forecasted Hourly Settlement Point Price (Fayette Power Project)

Cost of Production + Carbon Adder = Dispatch Cost

Objective = 30% carbon reduction at FPP within 2% PSA cost

Proposed dispatch

Current dispatch
January 2, 2019:

With Carbon Dispatch Adder:

~3,000 tons of CO2
or
24% reduction in CO2 emissions

Reduction in net revenue of $6,285
or
$2.05 per ton of carbon reduction

Intent is to reduce more carbon when it is inexpensive to do so and to generate when it would be too costly for our customers.
Flexibility
Weather Driven Supply Risk

February 3, 2020

South Texas Nuclear Project = 2,560 MW of Capacity

May lead to an oversupply of energy

Day Ahead Forecast  Real time Forecast  Actual Wind
Flexibility and Affordability
Price Spikes & Negative Prices on the Rise

ERCOT 2014 Supply Source

ERCOT 2019 Supply Source

Source: ERCOT
Affordability
15 minute Real-time Price (2019)

SHGTs
- 36% CO2 reduction @ $3.00 per ton
- 100% CO2 reduction @ $111.09 per ton
Rates Impacted

Bill Impact per Month for 1000kWH Usage (With Risk Premium)
Where are the emissions coming from?

- **DECKER STEAM UNITS RETIRE**
- **FPP Exit**
- **ZERO FOSSIL ASSETS** (2035 or sooner if economics dictates)
Customer Driven. Community Focused.