

[Pre-meeting Chatter]

Attendees can park at Austin Energy. Just tell them you are here for the EUC Working Group Meeting.

Al Braden: Just on the radio encouraging people to come and participate. (He and members of the sustainability committee were on Shades of Green, the radio show and podcast.)

[Al Braden is discussing the difference between power and energy with Gary (I believe), a citizen attendee of the meeting that is not a part of the working group. Everyone appears to know each other for the most part, shaking hands, small talk.]

10 people were there on top of the members of the working group. 2 women, 9 men. Bob Hendricks of Sierra Club. Robert of ATx Sunrise, Shane Johnson of Sierra Club, and Gary, who I don't know. The rest were employees of AE, giving presentations or commenting on the studies in the Working Group Packet.

Absent: Tam Hawkins

Meeting Starts. These are not all direct quotes but rather paraphrases, with some quotations.

Erika Bierschbach: Flu shots encouragement. Remember side effects. 1-2 days after the shot, and then go away. If you are sick, please stay home.

Cary Ferchill: Flu shot will be 60% effective. Which is high

Latest and greatest of working group members and dates. And the approved past charter that is finalized and out on the website.

The packets contain two reviews, Executive summaries of the presentations today. A definitions page, carbon neutral, zero emissions. And Carey will go over the goals.

You'll see a spreadsheet for the scenarios we ran and we'll have a brainstorming discussion.

Sheet with tables, at Al Braden's request, that are more readable than those in the studies. And you will find answers to the questions from last meetings.

Some questions were handed in late and they are not ready, but they will be addressed before next meeting. There were also some questions in regard to the storage program. So there is some information on that program.

One last item left over. There was an extended discussion of policies in regard to rooftop solar. Kaiba will be talking about that today.

Demand Side management report: Liz Customer energy solutions group.

Presenter: Liz Jamboor, customer solutions, Austin energy, and City of Austin.

[Al Braden took a picture of her. It was commented on, by Liz. “Oh are you taking my picture?” Laughter.]

What we are talking about today is a preliminary assessment: soon a 3rd party organization will conduct a more thorough study, which is to say that a higher caliber of detail will be provided in two forthcoming reports

Savings from 2020- and beyond impact by market conditions
Market penetration, customer participation

Liz: “We are dealing with adoption curve.” These look like a standard bell curve. As we have been working on demand side management for 30 years, we are on the far side of that curve. Thus, now we are dealing with laggards and it will take a lot to bring these people into the program

Austin is the “flip” of just about any other major city in the country in regard to the percentage of apartment vs home residents: 60% apartments, and 40% single family homes.

Returning participants generate more than first time participants.

They made projections based on participation rates and the weight of Demand Response at the current moment and projected that forward.

Best case projections (i.e. not business as usual) projections show 1100, 1200, and 1350 MW of Demand Response.

Follow up question on how many thermostats are currently involved. Liz admits that she doesn't know. They will know how many they have rebated, but not all of those involved.

Kaiba: Why would people want participate? I have a thermostat, but I don't participate, because Why would I? Pay Me! San Antonio pays its participants.

Liz's coworker (never introduced herself): We simply don't have the money. We rebate, but don't pay to participate. We anticipate to have pay for performance in the coming year. But they do not have that money or the payment rate/schedule worked out yet.

Al Braden: What level of participation do we have? When we hit 9000 last August, how many came online?

Erika: We don't have the final reports but somewhere between 65 and 75. (Idk what that means)

Liz's Coworker: There is a transition plan. All multifamily properties being constructed will have new smart thermostats. Thus, we are looking at about 5-10 thousand thermostats, (estimated), based on the "All Drop."

The New thermostats are wifi instead of radio. They will be more responsive and able to give you more information.

Cyrus Reed: Don't these scenarios assume we are going to have the same sort of technologies and programs that we have currently?

Cary Ferchill: No, not true.

Cyrus Reed: So these projections do include the emergence of these new programs.

Collaborative "YES"

Liz's Coworker: Taking out the radio thermostats, and going to wifi.

Estimate of 200 capacity,

Al Braden: Are we trying to broaden out the reach of the kind and amount of power that you can control: i.e. from thermostat, to washer and dryer, etc.

Liz's Coworker: They are looking at incorporating other smart technologies, but that has not been worked in to demand side management just yet.

Al Braden: If you have a sexy add millennials are gonna do that. "Alexa, turn off my thermostat."

Liz's Coworker: It's on our roadmap, its stuff that we talk about. But it has to have a plan. It has to be roadmapped.

Liz: We have to consider how many people will be willing to let Alexa and Google have access to their thermostat. And we will also need a specific platform to speak to both (Alexa and Google).

Cyrus Reed: How many of these "what ifs" are currently baked into the model.

Liz's Coworker: Everything we have been talking about has been incorporated. Whisker Labs were just brought on board. Water heater timers and other technologies involved in creating smart homes have already been lined up contractually. We have asked when they are going to be ready. They are

putting these timelines into the models. Everything we have discussed here is baked into these scenarios.

Cyrus Reed: Might be good to have an assumption grid of everything that has been incorporated into these projections.

Liz: Remember, soon there will be a more detailed study.

Janee Briesemeister makes a comment that she does participate in the DSM program. She comments about Pre-cooling. Where they run the AC before an event and lower the temperature to last through the event. Studies have shown that this Pre-cooling measure keeps people from opting out.

Kaiba: How long are these “events”

Liz: The “events” go from 4-7 hours usually. But it is not constant shut off. It cycles every fifteen minutes.

Ruby Roa: What about the folks without wifi?

Liz’s Coworker: That is a challenge. We are phasing the radio thermostats out. Most people wanted the wifi ones. They have also been working with google, trying to come up with a lot of approaches to deal with low income areas, that don’t have wifi.

Ruby Roa: Do we know how many people have wifi?

Liz’s Coworker: We do not. They would have to go to the wifi dealers, and they will likely not be game. To be candid, some people don’t like the smart thermostats. And they had to pull them out. They wanted the analog stick that goes up and down. Not everyone is into technology. So we have different thermostat models that we have to accommodate.

Bob Batlan: Two problems with rental units. The landlord and the renter.

Liz: As I have said, 60% of their customers rent. And a higher propensity of renters are lower income.

Liz’s Coworker: Customer solutions has hired a 3rd party to go look at low income families. This company has also recruited more multifamily properties. Groups of property owners have the ability to reach out to them and meet with them and have them oversee the installation of DR thermostats in all of their properties. This system is becoming more successful and this is how they are doing tune ups etc. in the future.

Ruby Roa: The owner or the managers, much of the time, won't go out and do the outreach. Can we do that outreach ourselves?

Liz's Coworker: We are doing these at no cost to them. Our 3rd party comes in and provides the education.

They have to give us reports on how many they have educated, etc. But these data analytics are new and still being developed. They just started this new system in May. A lot of low-income properties are trying to add these services anyway. And they are trying to make deals with google fiber, etc. on providing wifi. It's not just smart thermostats. Students need wifi. They are getting things like ipads and computers from school, but they are no good without wifi.

Ruby Roa: I just want to encourage thoughts about how to include the low income homes.

Janee Briesemeister: Austin does have a digital inclusion strategy. They may have the data on wifi etc.

Cary Ferchill intercedes. Conversation has been closed. They are getting back to the agenda.

Liz: Summary, this is a preliminary report. 2 more reports are coming later this year and mid next year. By mid-next year, they will have a very detailed report.

-----Switching Topics-----

Last meeting they went over the renewable, battery storage study.

Babu: The assumptions, how they modeled it.

In how use developed model that they use. Calculates the prices and they try to make the goal of 50 MW of storage by 2027.

2020-2050. which years are the best years? They determined that 2023-2027 were the prime years to meet the goals of 50 MW.

West Texas was determined to be the best to place to construct the storage.

Consulting Table 4.3.2. They are showing revenue minus cost.

Yearly cash flow.

50 MW of energy storage.

For Energy Arbitrage and Ancillary Services.

If they are going to put 50 MW of energy storage, with 10 MW every year for 5 years. Installing 10 MW by 2023, you are going to lose 2.5 million; 2024 2.173; 2025 (Did not get the figure); 2026 (Did not get the figure); 2027, 1.152 million.

[There was a lot of confusion about reading this table. Many people were confused in many different ways.]

Cary Ferchill: [Vox Article](#) on the site, gives you an overview of where batteries are, technologically, and where costs have to go to make energy storage work. There is also a link to a study done by a lab at MIT that gives you richer detail and more information. It is something you can read, and in a few pages you can get a grip on the situation.

Al Braden: I am confused because according to [ERCOT](#). There are other studies on energy storage that are a lot cheaper than this. This seems a bit pessimistic based on the average. According to the studies I have seen.

Cary Ferchill: Ok, fine. Even if these numbers are high in comparison to some others, we are talking a magnitude. Prices are going to have to go down 50-80% to make them profitable.

Cyrus Reed: Right, but you are going off of today's prices. In 2027, batteries will be cheaper. Also, and this could be my naivete, but I always assumed we would put batteries here.

Babu: 80-90 percentage of storage is in West Texas. Locating it there you can charge it during the day and release it during the night. The decision to store it in West Texas is influenced by the fact that we don't have transmission to send the electricity out there. We do have transmission to send it from there to here.

Cyrus Reed: Right, but what about the added benefit of building solar plus storage here.

Analyst: The cost is not low enough to warrant near batteries.

Cyrus Mentions the SHINES Project.

Erika Bierschbach: SHINES was 80% subsidized. And one of the hardest bits was integrating the systems.

Al Braden: It's just so important that you are doing shines

Erika Bierschbach: It has been a very valuable exercise. And we are going to continue learning how it jives with our system.

Kaiba White: So, based on what you are saying right now, the Carbon free by 2030 resolution and plan did not have any storage incorporated into it?

Collective: No.

Al Braden: Isn't the fundamental issue in ERCOT that gas is too cheap and so you can always buy gas instead of storage. Well, gas prices could go up, and that would change things. These models don't seem to incorporate that.

Babu: It's not arbitrage, it is ancillary services.

Collective determination: Solar + Storage is something they can look at.

Cary Ferchill: Ok. Pass to Kaiba White, who was on vacation last week. One of the questions last week dealt with the policy goal behind rooftop solar distributed energy systems.

Kaiba: Like what is the goal? Or the reasoning behind the goal?

Cary Ferchill: What is the benefit to consider rooftop solar as opposed to all community solar?

And utility scale solar locally, ie. Why have solar in Travis county rather than West Texas?

Kaiba White: A reason close to my heart is to avoid developing open land. Houses are already developed. And as much as I love solar and wind, they are not zero impact. So, with distributed rooftop solar, we are not further disturbing the natural environment. That is an environmental reason. But there are other good energy related reasons. Take Resiliency. Solar on its own, in terms of resiliency, isn't good. But having self-sufficient solar homes, businesses, schools adds resiliency to the city. As it becomes affordable, we can add storage. Thus, on top of producing energy, we can also pair solar with batteries to add resiliency. That is something AE was looking at. They were first looking at Rec centers. Not just power production, but also places to take shelter in times of crisis, where we could still have shelter and energy through islanding and having some local generation. The community level solar does that too. I do not see community and rooftop in competition. We should have some of it all. There is a benefit there, just from a "hedging our bets" sort of standpoint. The final

one, “maybe the most important” is that rooftop solar equates to creating and maintaining local jobs. Because you will always need local people to be here to be installers on a regular basis. Renewable energy is higher dollar, in comparison to other entry-level jobs. But rather than large solar installations, where labor and expertise can be shipped in, we want rooftop solar, where the labor demands are too long term and consistent for outside contracts. The concern for equity with green jobs here in Austin is on people’s mind. We need to move forward on our utility goals, while also getting people into these positions where they can have good jobs and even if they didn’t go to college.

Todd Davey: In reference to the story on KET. Is rooftop solar considered generation?

Erika Bierschbach: It is considered distributed generation. It isn’t dispatchable. It is behind the meter.

Kaiba: It could be dispatchable if you have a smart inverter. But it doesn’t have to be behind the meter either, it could be a utility resource.

Erika Bierschbach: Behind the meter, you could make it dispatchable, but you are not going to get a price signal. Because it is not large enough to be sold on the market.

Kaiba: Distributed solar, it might make sense in an aggregated way. You would/might want a lot of homes with smart inverters.

Cyrus Reed: According to the study, can we get to 300 MW 2025, and 350 MW 2027. Local solar MW 373 by 2030.

Erika Bierschbach: Local solar includes Blacklands and Webberville. 174 MW is utility scale local solar. Rooftop is at 90 MW, but it is increasing.

Someone: If you look at pg 10, it is all laid out. Residential and commercial, rebated and not. Community, and utility.

(Kaiba and Cyrus are discussing the charts. Trying to figure out the breakdown.)

Bob Batlan: Ruby said something about the thought process on how local solar is being used in more affordable situations, he would like a lot more on how that plays out.

Cary Ferchill: There are installations on multifamily, low income housing. Community solar is available too.

Bob Batlan: How much of the low-income stuff is community solar, vs rooftop?

Kaiba: More is rooftop, because community is still small. Looking out towards the future there will be more opportunity.

Either Cary or Erika: Some Multifamily units have solar energy that goes toward the load at common spaces, so not directly to the tenants. There are others where the benefits are going directly to the tenants. Presentations are out on the website. Would it be useful to discuss those ideas at the next meeting? One of the reasons for last meetings presentations, was because of the questions related to the studies that were presented. So, if you would like for that study to be discussed, we can put it on the agenda.

[a lot of the above discussion was very technical and over my head and so I missed a lot of it]

Cyrus: I remember a study that discussed a way to get to more solar and storage without costing more money.

Cary: I know the study you are talking about and here is a preview, if it could be done, **it doesn't move the needle. It just cannot work financially.**

Kaiba: Before you get too negative, there are things moving forward.

Cary: Things are moving forward, but that doesn't mean they are "economical." **Programs that don't move the needle, don't do a lot for us.**

Cyrus Reed: Perhaps we don't need a presentation on the studies, but can I ask some questions and have some responses. Kaiba and I can generate questions.

Cary Ferchill: Sure, take a look at those studies. I have looked at them. We had to get them converted to English. But I have seen the late ones.

Cary Ferchill: Next issue is overarching goals. The first thing we need to talk about is what we are ultimately trying to get. Now, ultimately we are all trying to get to a "green utility." Of course, there are varying ideas of what that means.

We need to really stay focused on things that can move the needle. What kind of resources can we invest in that can help us reach our goals? We can have brainstorming sessions. But **there is no need to ask things like, "what happens if we add 2 MW of this?" You would need a microscope to see if it would make a difference.** We need to find real resources that will make a difference. Let's try to be as practical as we can and not really do science projects. That's one of my learnings from the last three times being on these committees.

Erika Bierschbach: **Carbon free? Green utility? What does this mean? Zero Carbon, all renewable, or net zero carbon. There are lots of definitions of that.** We Included definitions of what each means. People frequently use net zero, but no one knows what you are netting out and what that means.

Cary: The second thing is, it's happening in other groups and will happen here, one of things we find out. "I wanna be 100% renewable." But it costs 5x as much to be 100% as it does 95%.

Especially as it concerns having resources meeting up to meet your load. If I can make 95, maybe that's where we need to be until technology catches up with us.

Erika Bierschbach: Segway to Matrix. Walk through and define and explain the matrix. We want to hear from the WG what scenarios are of interest to be added.

100% of our load is purchased from the market. We sell our renewable energy to the market and buy energy to match our load from ERCOT.

Our gas units would dispatch economically, the steam units are gone, coal is gone. We can either purchase or sell MW from the grid. Anything *behind the meter* is decreasing our load. In front of the meter we buy from Weberville/Blackland, and sell to ERCOT.

Increasing sales by 10% to 75%. Doing the same for the 80% renewable scenario, and then 100% renewable. In the 100% renewable it is 123% renewable.

Kaiba: But you are still running gas and nuclear?

Janee Briesemeister: 100% renewable is not nuclear...

Erika: No, its not

Someone: So, you are contracted over your load?

Kaiba: I wish that I knew that this is how you interpret carbon free, because that's not what we were thinking.

Al Braden: I don't understand that part.

Erika Bierschbach: we are not really balancing anything. We do not match our load. So...

Kaiba: well you are not required to. But you could have that as a goal. This came out of the resolution, right?

Collective: NO, no it didn't

Cyrus: The "carbon free" study that we wanted you to do was going to have something without gas. And you didn't model that, but that's okay. We can ask you to model that.

Al Braden: Yes, carbon free.

Cary: Carbon free in that we are generating 100% of our load, and it is all carbon free?

Kaiba: But there is another important and here, that there is no gas.

Someone: So the goal is not carbon neutral?

Shane: [from the crowd] Carbon free is not carbon neutral.

Carey: There are two distinct problems here: 1) How do you generate your load with renewables? And 2) Do you turn off our assets that are making money and that are keeping our prices low?

Al Braden: I just don't get what carbon free means in that scenario.

Babu: This was what we were calling carbon free from a generation standpoint.

Erika Bierschbach: Generation is just an investment.

Kaiba: Net zero would have to offset your emissions. i.e., you produce enough to offset the extra emissions from your own natural gas.

Carey Ferchill: One of the scenarios could be "let's just turn off everything that produces carbon dioxide." And there is a cost to that. We have resources that burn gas and make money when prices are really high. And that helps keep our prices down. And we need to look at how much it is worth to continue to do that. I have no idea what those numbers look like. What if we had to double our rates? For example. Now, we are not going to build anymore new gas, I can guarantee to you that. And there is a life expectancy to those power plant projects.

Kaiba: I'm confused. How could there be such a huge rate impact? This has been modeled before and it did not double the rates.

Cary Ferchill: I'm not suggesting that it doubles rates, but I will say that there is a cost benefit analysis that needs to be done.

Al Braden: Well yea. Of course, that's what we are doing, but we can't assume.

Cary: Timing is everything, and if you buy a resource before it is ready to be bought it can cost you an arm and a leg. We have made that mistake before. We are trying to avoid it. We are not going to do any more gas. As those assets get old and are no longer profitable, we are going to turn them off. If that is 2023 as opposed to 2030, how much is that worth. That is what we need to be modelling.

Cary: I forgot to bring up the main idea in the overarching goals discussion. We need to be looking at this as big mandates. Like getting to 100% renewable or zero carbon by a certain date. Not "lets add this plant, by this date." We want to give big demands to the staff, and let the market figure out what we need to get there. We need to give big demands, broad directions.

Cary: And I will volunteer the easiest one to get to. We will not invest in any other assets that generate carbon.

Cyrus Reed: I second!

(Laughter!)

Cary: With either PPA or building facilities, we are not generating any more carbon assets.

Bob Batlan: I also want it on paper that we are interested in affordability goals.

Al Braden: Sure, we've done that all along.

Bob Batlan: I know we've done that all along, and it's in the mandate... But there are new measures that are more effective at figuring out how this is affordable. And I have to say that I was taken aback when the overarching goals did not include affordability.

Ed Latson: I agree, affordability is most important in our universe. I kept hearing concern for environment and not affordability and it was concerning to me.

Al Braden: affordability is not only you guys, and the industry, but the low-income people too.

Cary Ferchill: Look at wind and solar at ERCOT. It's financial. The financial and environmental resources are aligned.

Cyrus: I agree with you about being general. I do always think the DSM goal is important, because that is what everyone pays for. We need demand response to prevent high prices. And also, efficiency goals. And in these instances we would need some clearer/more precise direction. In reducing demand.

Cary: I am inclined to agree with you. We need some direction, but in the large scheme we need to be flexible.

Cyrus: What's a reasonable amount of other scenarios we could run, is it 1 or 5 or what?

Erika Bierschbach: something between 5-8 scenarios. Requesting, not incremental things.

Cary Ferchill: Looking for large scenarios. Not incremental, 5 more MW or something here.

Erika: The expense is staff time. Analyzing the data, making sure the inputs are what we want them to be.

Babu: Apart from scenarios, you have to run ancillary scenarios on the risk. One scenario could have a lot of what ifs...

Todd Davey: What if we are looking at something nonlinear. That looks like a hockey stick.. can you show the sensitivity? Like how much difference there would be at 80/90/100?

Babu: We have to run each scenario.

Cary: Look at what the Vox Article was discussing. We have to have battery to be 100% renewable. And, at the US scale, it will cost 5x as much for 100% than 95%. Because there are **black swans**, occasional scenarios. Long dry spells and long wet spells. We need to build so much capacity into the system to cover these wildcard scenarios.

Cary: None of these scenarios we are talking about are nonlinear. You are not going to see those dramatic changes.

cyrus: Is there any sort of chart on the expected retirement dates of carbon facilities?

Erika: The only date is Decker?

Cyrus: What about the expected age of retirement?

Cary Ferchill: Don't have a chart that shows end of life for each particular peaker. Just Fayette and Decker. Which have retirement plans.

Erika: Sand Hill Combined cycle is not like all the other combined cycles. There are custom. That is not a transparent number.

Babu: Typically the **lifespan for combined cycle is 45 years**. But there is variation.

Todd Davey: Yea, I mean you **can continue to run fully depreciated asset**.

Kaiba: What about a ballpark estimate of all these plants?

Erika: there is a cost analysis to that. They are not building new assets in ERCOT.

Cyrus: Back to the chart. Raise the 65% to 77%. (Shane) and the Renewables chart should have no dispatched gas.

Kaiba: Is it doable to add storage to one of these?

Cyrus: since its more expensive... add solar plus storage, where we can experiment with affordability. Because if you just add storage, it would be above affordability. So we need to put in experimentations to see if some arrangement is more affordable.

Adjourned at 6:05

[post meeting] Shane: Lithium ion batteries are locked in just like silicon panels are locked in.