

MEMO

AZ TE PHASE II PLAN – WORKSHOP 2 QUESTION LOG

PREPARED FOR: APS and TEP
PREPARED BY: E3, ILLUME
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The following questions and comments were submitted by attendees at Workshop 2 (November 11, 2020) through the Zoom Q&A and chat box features. We show corresponding responses provided in real-time during the workshop as well as follow-up responses provided by the E3 and ILLUME team.

PRESENTATION OF STUDY FINDINGS TO DATE

STAKEHOLDER1 02:09 PM

I fully support a statewide plan and overarching goal!

STAKEHOLDER2 02:11 PM

An adoption rate consistent with no more than 1.5°C of Climate Change should be a goal.

STAKEHOLDER3 02:12 PM - Agree, STAKEHOLDER2. Calculating that will be dependent upon emissions of grid, as well.

STAKEHOLDER4 02:12 PM

If there is not good data, then we should also propose to start collecting it.

APS1 02:17 PM – STAKEHOLDER4, we have had trouble collecting granular data from ADOT. It is possible that others may have better luck, I understand that they can release more data for research purposes but have not heard of anyone being able to collect that.

STAKEHOLDER5 02:20 PM

Just as an FYI - NAU has our own transit bus fleet (21). Not sure if they are elsewhere in the numbers.

Correction - 24 including our charter buses.

STAKEHOLDER2 02:20 PM

What brand of bus is Flagstaff using?

APS1 02:26 PM - you might want to reach out to Bizzy Collins who is leading that effort. I am not sure if they have selected a bus vendor yet.

STAKEHOLDER6 02:27 PM

[E3], have you looked to quantify the electrification of stationary refrigerated trucks oppty in AZ?

E31 02:40 PM - Hi STAKEHOLDER6. We have some more detail on this in the additional market assessment slides (appendix), but we haven't done a cost benefit analysis of this opportunity, if that's what you're asking.

STAKEHOLDER1 02:41 PM - STAKEHOLDER6, APS's 2020 DSM was actually approved with a refrigerated electric truck EE measure. I'll send you the order.

STAKEHOLDER6 02:44 PM - Thanks both of you, I think it's a good opportunity for GHG reduction.

STAKEHOLDER1 02:28 PM

What is the expected number of EVs in Arizona by 2030 under the "high ambition scenario"? I saw 20% but am curious about the actual vehicle number.

E31 02:39 PM – We'll have to follow up on this one - I don't have the number in front of me, but will be happy to send it along after the call.

[Follow up]: The high adoption scenario assumes approximately 755,000 electrified LDVs by 2030 in the APS and TEP service territories. This is based on the assumption of 20% of LDVs needing to be electrified by that year in order to reach global climate targets.

STAKEHOLDER2 02:30 PM

Time-Of-Use rates need to have enough of a differential to actually motivate behavior change.

STAKEHOLDER1 02:33 PM

For your high adoption, what % of managed charging are you assuming?

In the managed charging scenarios (base + managed charging, and high adoption + managed charging) E3's modeling assumes 100% of EVs charge in a managed fashion, based on time-of-use electricity rates.

STAKEHOLDER7 02:35 PM

Does societal cost/ benefit include the loss of gas tax revenue to the state so we can work on solutions to mitigate this revenue loss?

E31 02:38 PM – Hi STAKEHOLDER7. The societal cost test does not include this lost tax revenue, but I think this is an important topic for discussion as solutions to that issue will need to be a part of a comprehensive TE plan. The amount today is small, I believe, but would of course grow as the EV population increases.

STAKEHOLDER8 02:38 PM

No Heavy-Duty Benefits?

E31 02:39 PM - Hi STAKEHOLDER8. We're showing just personal LDVs in these specific charts, but full results are included in the appendix slides.

STAKEHOLDER9 02:39 PM

Did the analysis only investigate Plug-in and Battery EVs or Fuel Cell EVs too?

E31 03:33 PM - Hi STAKEHOLDER9. As mentioned verbally earlier in the call, the analysis is based on plug-in electric vehicles (battery electric and plug-in hybrid, for LDVs, just battery electric for MDVs / HDVs). We did not look at fuel cell EVs in this analysis.

STAKEHOLDER3 02:40 PM

Does the "Emissions" savings account for healthcare savings due to cleaner air?

Health co-benefits are modeled separately in the Air Quality Potential analysis, using the U.S. EPA's COBRA tool.

STAKEHOLDER6 02:43 PM

Have you modeled the net benefits of managed charging as we increase our proportion of renewables on the grid?

The modeling across all scenarios includes APS and TEP forecasts of their electricity resource mix over time, based on their Integrated Resource Plans. As such, we have modeled the benefits and costs of TE over time, which includes assumptions around increasing renewables (and decreasing GHG emissions) throughout the study period.

STAKEHOLDER10 02:45 PM

Do the costs and benefits include possible rate increases due to the costs of improvements to the grid to support the increase in EV charging demand?

Our assumption for retail electricity rate increases is a straightforward annual percentage increase.

STAKEHOLDER11 02:45 PM

How does this model assume the new electricity will be generated? Is it all solar, nuclear, coal?

The modeling across all scenarios includes APS and TEP forecasts of their electricity resource mix over time, based on their Integrated Resource Plans. As such, we have modeled the benefits and costs of TE over time, which includes assumptions around increasing renewables (and decreasing GHG emissions) throughout the study period.

STAKEHOLDER4 02:45 PM

Did the fuel savings assume the same escalator on fuel price versus utility rates?

No, fuel cost increases are based on the Energy Information Administration, whereas electricity rate increases assume a straightforward annual percentage increase.

STAKEHOLDER12 02:47 PM

In the process of monetizing benefits did you model reductions in concentrations of criteria pollutants, i.e., PM10, PM2.5, and ozone?

E32 02:51 PM - Criteria Pollutants (VOC, PM10, NOx, SOx) were included in the analysis.

STAKEHOLDER12 02:52 PM - Understood but did you model the amount of reductions in ozone & PM concentrations and can you share that too?

E3 will provide reductions in different criteria pollutants across the scenarios modeled as part of the full Phase II TE Plan report.

STAKEHOLDER4 02:49 PM

The state pays \$35B in health care costs. If 1% was used for prevention (by supporting EV adoption to improve air quality) that equates to \$350M.

STAKEHOLDER4 03:02 PM - (Resubmitting comment as I am not sure if it entered). The State currently spends \$35B on health care annually. If 1% was used for prevention related to air quality by supporting EV adoption, that would equate to \$350M.

APS1 03:04 PM – STAKEHOLDER4, do you have anyone at the State that would be willing to take that information and propose a bill in the legislature that the State dedicate some funds to support EV adoption? Would it pass?

STAKEHOLDER4 I think the legislature listens to utilities and businesses more than it does cities, yet I think an air quality bill would be non-partisan if it is positioned correctly. It has potential, but it definitely requires more discussion. Air quality and ozone relate to EPA compliance and could positively influence business attraction to Arizona. EVs are a solution to pollution.

STAKEHOLDER3 02:50 PM

So, these air quality/health benefits were reflected in the light green "Emissions" benefits in the previous charts, right? In the SCT per vehicle bar chart.

The emissions benefits shown in the cost-benefit analysis results are the avoided carbon emissions attributable to TE, valued using U.S. EPA estimates of the social cost of carbon. The air quality co-benefits shown in the air quality potential analysis section are distinct and are based on estimates of the human health impacts (i.e., improvements) from the net change in criteria pollution associated with TE.

STAKEHOLDER12 02:50 PM

Have you modeled the benefits of community equity measures such as any purchasing incentives and local car sharing programs?

APS1 03:00 PM - I have seen that the EV adoption per capita in Colorado has increased over that of Arizona once they began incentives.

We have not modeled specific incentives or policy actions as part of our analysis.

STAKEHOLDER2 02:52 PM

What communication strategy makes sense to help people understand health and climate benefits that don't appear directly on people's energy bills?

Great question, and one which will get different responses from different people. We hope that stakeholder input on issues like this can help to inform the Gaps Analysis and Recommended Actions sections of the Phase II TE Plan.

STAKEHOLDER6 02:57 PM

What proportion of our emissions are attributed to LDV vs heavy duty?

E31 03:36 PM – STAKEHOLDER6, I'm not sure if this was re: carbon emissions or the local air pollutants from the air quality analysis, but U.S.-wide transportation-related carbon emissions (from 2018) are 43% passenger cars, 17% light-duty trucks, 24% medium-duty and heavy-duty trucks, 9% aircraft, and smaller proportions from other sectors (e.g., 1% buses). There's a slide on this in the appendix.

STAKEHOLDER14 02:58 PM

How will autonomous vehicle adoption inform these metrics and benefits?

This is a good question, that doesn't necessarily have a straightforward answer. Many believe that autonomous vehicle technology can augment and improve upon the benefits of TE, especially when electrification, autonomous vehicle technology and ridesharing are planned around in a holistic fashion. One interesting resource is the work of Professor Dan Sperling at UC Davis, and specifically his book "Three Revolutions: Steering Automated, Shared, and Electric Vehicles to a Better Future."

PRESENTATION OF WORKING GROUP UPDATES

EV INFRASTRUCTURE WORKING GROUP UPDATE

STAKEHOLDER13 02:58 PM

STAKEHOLDER1 brings up a good point [see STAKEHOLDER 1 2:28 PM] in regards to an overarching goal for EVs and is also something we've considered in the context of the EV infrastructure WG, i.e. how much infrastructure would be needed to support such a goal and how can we design the work products to move us closer to achieving that overarching goal?

STAKEHOLDER15 03:03 PM - As do I, I think this is critical to provide an overarching goal to tether this exercise too.

E31 03:40 PM - Thanks STAKEHOLDER13, good context.

STAKEHOLDER2 03:08 PM

Some policy action items include:

- EDUCATION & OUTREACH
 - Opportunity to promote Time-Of-Use rates for Cost Savings & Grid Optimization
- COSTS OF CHARGING INFRASTRUCTURE
 - Charge where you already are. (Lots of low cost 120V & 240V Charging more convenient than fewer expensive high-power chargers.)
- BIPOC & UNDER SERVED COMMUNITIES
 - Need Multi-family Right-to-Charge legislation & EV Ready Building Codes
- UTILITY PROGRAMS, APPLICATIONS, & INVESTMENTS
 - Demand Charges are a significant barrier to DC Fast Charging. Need No-Demand-Charge EV Rate Plan (Public LPV, Transit, Trucking)

APS1 03:08 PM

Looking forward to the virtual ride and drive at the TE forum.

STAKEHOLDER16 03:10 PM

Thank you for including Black, Indigenous and People of Color (BIPOC) and underserved communities in your EV Infrastructure considerations!

STAKEHOLDER4 03:10 PM

Would utilities support charging infrastructure in new construction for builders? For example, California has costs about \$100 per dwelling at the time of construction to have a dedicated branch circuit to the panel box.

APS1: 03:16 PM – APS is beginning a \$100 rebate for home builders to include level 2 in new builds.

STAKEHOLDER17 03:11 PM

+1 for rate design. Thanks for flagging, STAKEHOLDER1!

EQUITY WORKING GROUP UPDATE

STAKEHOLDER4 03:15 PM

Equity Comment: some of the neighborhoods in cities with the worst air quality are low income neighborhoods. This could be prioritized for providing electrification solutions.

STAKEHOLDER4 03:16 PM

Electric Bike support could be a good affordable solution for low income.

STAKEHOLDER2 03:17 PM

An EV sales tax exemption would be helpful to reduce first cost.

STAKEHOLDER4 03:20 PM

General Comment: Utilities could offer a program to manage charging for a \$ benefit to consumers similar to the \$30 rebate for programmable thermostats.

The \$30 rebate above is each year that APS has the ability to adjust your thermostat on peak hours. The equivalent for EVs would be to speed up or slow down charging.

APS1 03:23 PM – Great idea STAKEHOLDER4. I will share it with the [\[APS and TEP planning\]](#) team

PROGRAMS AND PARTNERSHIPS WORKING GROUP UPDATE

STAKEHOLDER18 03:24 PM

Agreed [\[re: Programs and Partnerships update information\]](#). I believe on the last call APS1 mentioned 1.1 million EVs by 2030. Seems like that should be the starting off point. Also, would be good to specifically add on goals for transit & school buses +.

STAKEHOLDER2 03:26 PM - It would be helpful to express that as a percentage of new vehicle sales.

STAKEHOLDER3 03:25 PM

STAKEHOLDER1 - I would add universities to the Government Agencies list. [re: Programs and Partnerships update]

STAKEHOLDER1 03:35 PM - Great idea STAKEHOLDER3! I will ping you on how we loop universities into the acquisition funnel.

GOODS MOVEMENT AND TRANSIT WORKING GROUP UPDATE

STAKEHOLDER2 03:29 PM

AZ rejoining the CARB states would dramatically increase the number of models available.

STAKEHOLDER4 03:31 PM

Will you send out the presentation slides automatically?

ILLUME1 03:34 PM - Hi STAKEHOLDER4. We will distribute the slides, as well as the video recording soon. They will also be posted on the microsite.

STAKEHOLDER18 03:32 PM

Yes and bring additional air quality and public health benefits!

VEHICLE GRID INTEGRATION WORKING GROUP UPDATE

STAKEHOLDER4 03:50 PM

An idea: one issue in existing multi-family is the expensive transformer upgrade to add EV charging. A solution is to pair it with Energy Efficiency upgrades to create spare capacity for adding EV load.

STAKEHOLDER3 03:54 PM

So, STAKEHOLDER6, it sounds like the rate-making process will need to evolve to be able to accelerate and respond to changing technology and energy supply environment, right?

STAKEHOLDER6 Yes, the value proposition of when on and off peak prices are scheduled is going to change for a variety of reasons, including but not limited to a sharp growth in the share of the intermittent renewable power supply, evolving load profiles for devices like electric vehicles, and changes in workplace structures (i.e. more work from home). The rate-making process will need to be more responsive as these evolutions take place largely simultaneously. The reason we recommend a stacked approach for Program design is complementing evolving TOU windows with Demand Response for instance. This would allow the ability to mitigate the impacts of phenomenon such as artificial peaks in response to TOU rates without depending on an ever more complicated rate design alone.

STAKEHOLDER2 03:56 PM

What communication system is available to communicate charge rate change requests?

STAKEHOLDER6 This depends on the layer of the ecosystem you are trying to engage with. If load sharing is designed at the panel level to avoid costly electrical upgrades the charge rate change or load sharing specifically in this case is simply a function of the circuit level design and the number of cars charging. If we are looking at the fleet level for things like managing demand charges or charging during TOU windows, this can be done at the enterprise software level for the vendor being worked with. If this is for a grid scale DR program a DERMS platform will likely need to be used so that devices from multiple vendors can be communicated with.

FINAL COMMENTS

STAKEHOLDER19 03:57 PM

Just a more general statement, the Lung Association supports setting an overarching goal for this process to achieve at least 1 million electric cars by 2035 to inform this process. This can help to lead the way for even greater numbers when considering the state as a whole and the full suite of electrification we need across the transportation sector.

STAKEHOLDER20 03:58 PM

Thank you! Hopefully we can have a little more coordination between groups as we come down the home stretch.