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STATE OF CALIFORNIA

CALIFORNIA ENERGY COMMISSION

In the matter of:

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	)	RE: Electricity and Natural Gas Demand Forecast

IEPR COMMISSIONER WORKSHOP ONELECTRICITY AND NATURAL GAS DEMAND FORECAST FOR 2021-2035

REMOTE VIA ZOOM

THURSDAY, DECEMBER 2, 2021

Session 1: Additional Achievable Energy Efficiency and Fuel Substitution Forecast Results

10:00 A.M.

Reported by:

Martha Nelson

APPEARANCES

COMMISSIONERS

Andrew McAllister, Lead Commissioner

Siva Gunda, CEC Vice Chair

Patty Monahan

Karen Douglas

CEC STAFF

Heather Raitt, IEPR Manager

Heidi Javanbakht

Ingrid Neumann

Dorothy Murimi

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P R O C E E D I N G S

10:00 A.M.

THURSDAY, DECEMBER 2, 2021

MS. RAITT: So good morning, everybody. Welcome to today's 2021 IEPR Commissioner Workshop on the Electricity and Natural Gas Demand Forecast for 2021-2035. I'm Heather Raitt, the Program Manager for the Integrated Energy Policy Report, which we refer to as the IEPR.

This workshop is being held remotely consistent with Assembly Bill 361 to improve and enhance public access to start-- excuse me, to state agency meetings during the COVID-19 pandemic by allowing teleconferencing options. The public can participate consistent with the directions provided in the notice for this workshop.

All IEPR workshops are recorded and the recording will be linked to CEC website shortly following the workshop. And a written transcript will be available in about a month.

To follow along, the schedule and slide decks have been docketed and are posted on the Energy Commission's website. Just go to the 2021

IEPR page.

We also posted an update to today's agenda. We had originally planned to discuss behind-the-meter distributed generation and storage this morning, but that topic will not be discussed today.

In the afternoon session, Staff will present its forecast for transportation electrification. However, the discussion of the annual end-user electricity and gas demand is being deferred to the workshop on December 16th. Instead, Staff will discuss the new long-term demand scenarios projects this afternoon.

We will be hearing more about these changes in the introductory presentation this morning.

So with that, I'll go over how attendees may participate in the workshop today.

For those joining through the online Zoom platform, the Q&A feature is available for you submit questions. You may also upvote a question submitted by someone else. To do that, click the thumbs-up icon. Questions with the most upvotes are moved to the top of the queue. We will reserve a few minutes after the second

presentation this morning to take some questions from the Zoom Q&A, although we may not have time to address all questions submitted.

Alternatively, attendees may make comments during the public comment period at the end of the morning and afternoon sessions. Please note that we will not be responding to questions during the public comment period.

Written comments are also welcome and instructions for doing so are in the workshop notice. And written comments are due on December 16th.

And with that, I'll turn it over to Commissioner Andrew McAllister, who is the lead for the 2021 IEPR.

Go ahead. Thank you.

COMMISSIONER MCALLISTER: Oh, gosh.

MS. RAITT: Commissioner, I think you're -- there you go.

COMMISSIONER GUNDA: We can hear you, Commissioner.

COMMISSIONER MCALLISTER: Okay, here we go. Yeah. Sorry. I was trying to find my screen. One of the hazards of remote workshops is too many screens open.

So, well, thanks, everyone, for being here. I want to particularly thank Vice Chair Gunda and Commissioner Monahan for joining us today. Really excited about today's workshop.

And I want to, first, just start off by appreciating the IEPR Team for all the work that they do, and the various Staff teams behind what we'll see today in the presentations, in particular, flexibility. We're all about load flexibility, you know, these days in California, trying to enable as much flexibility out there in the grid as possible.

Well, you know, our team has had to be flexible, as well, in terms of constructing the IEPR workshops. And you know, we have a number of teams working on detailed analyses and specific topics and really trying to -- really doing our best work. And so that sometimes, you know, schedules change and the data is not available in the time frame we might have liked. So kind of rolling with all of that, all those real-world developments, is something we have to do in the IEPR, and that's reflected in some of the changes today. And then that will result in a better product for the forecast and all the

other topics that we're working on this year.

So anyway, I just wanted to note how much I appreciate the staff moving forward on many fronts at once, and we'll see some of those fronts today. So really excited about the whole day but, in particular, the additional achievable energy efficiency, that's a core piece of the forecast that we do every time.

And then fuel substitution is a new element in the forecast that is also very much front and center moving forward. And so it's really great to be -- it's gratifying to see that analysis kind of being culled through and Staff coming up with techniques and approaches to project fuel substitution as a decarbonization strategy going forward and really highlighting the links between the gas and electric systems at the end-use level. So that's for the morning.

And then the afternoon, transportation, and a really exciting demand scenarios projects, as well, looking out further than we normally do.

And with that, I think I'll just, again, thank all the staff and the presenters that we'll see today and looking forward to a robust session.

And I'll pass the microphone to Vice Chair Gunda.

COMMISSIONER GUNDA: Thank you, Commissioner McAllister.

And welcome to everybody who is attending today, the workshop, all the staff, and my fellow Commissioners, Commissioner Monahan and Commissioner Douglas, who have also joined on the dais today.

Just kind of at a very high level, and it's always important to start with thanking Heather and her team. And it's one of those things that's both visible and mostly invisible, all the work they do in the background.

Heather, thank you so much for putting this -- and, also, there were a lot of last-minute changes on the agenda today. Thank you for working with the staff closely to adjust the agenda. And I look forward to Heidi covering some of those aspects in her presentation after this.

I also want to thank, you know, the leadership in the Forecasting Team, Aleecia Gutierrez, the EAD Deputy Director, Matt Coldwell, the Manager for the Demand Analysis,

and the Supervisor, Heidi Javanbakht, who we'll hear from in a few minutes, who have tirelessly been working this year with the COVID, with teleworking, and a number of our resources, you know, kind of compromised this year, it has been extremely difficult for the team to continue to do the work they do, so thank you so much for the leadership.

And I just particularly want to note Nick Fugate and his contribution in making sure all this forecast is pulled together and all the other staff who work behind the scenes.

I also want to note, as Commissioner McAllister mentioned, we have been working closely with the stakeholders over the last two years to really think through how we modify the forecast moving forward, how do we ensure the forecast becomes an important element that supports not only the ten-year planning regime but, also, the broader 2045 goals? And we have, you know, kind of contemplated this idea over the last year-and-a-half to start adopting the demand scenarios which provide a broader time frame but, also, looks at that idea of scenarios.

So really grateful for the advances that

the team has been able to do there. Mike Jaske and Anitha, all your work there, just really grateful for pulling that today. So I look forward to hearing those today, as well.

As you all know, but it's kind of good to kind of, you know, continue to socialize this and remind ourselves that the forecasting that the CEC plays an integral role in the state planning efforts. You know, CEC has a particularly important role in being the venue to help foster ideation of different policy ideas but, really, it's underpinned by a lot of the analytical work we do, and forecasting is one of those foundational elements.

So as we moved forward over the last couple of years, there has been a lot of changes, both on the building sector, you know, with the electrification goals and the fuel substitution goals that Commissioner McAllister highlighted, and some of the work that Commissioner Monahan has been working on with the transportation, the electrification strategies there, and the decarbonization strategies there, there is a lot of uncertainty into -- in reasonably forecasting the future.

And it's, you know, it's very important for the team to closely work with broad stakeholders but, also, the sister agencies here, both CAISO and CPUC. And you know, the staff, you know, meet every week with CPUC and CAISO through the Joint Agency Steering Committee process and continually calibrate on how to move forward in the collaborative and robust fashion.

So I'm going to call a couple of colleagues out from CAISO and CPUC, Simon Baker from CPUC whose leadership has been invaluable at the JASC level, and Delphine Hou from CAISO for all the work that they do in bringing these different elements together.

So as Commissioner McAllister laid out the agenda for today, so I'm not going to repeat that, but just want to say it's been an incredibly taxing year for the staff, and I am just extremely grateful for all the work you all do, especially given some of the challenges we've had, unexpected challenges we had over the last month. I just want to say thank you from the bottom of my heart for your hard work.

And, yeah, with that, I'll pass it on to Commissioner Monahan or Douglas if you want to

make any comments.

COMMISSIONER DOUGLAS: This is Commissioner Douglas. No additional comments from me, just add to the thanks and welcome, and I'm looking forward to the workshop.

COMMISSIONER MONAHAN: Well, just a few words. I think coming on the heels of Thanksgiving food is still on my mind. And I've been thinking about how we've been having like a series of workshops, which is kind of like arranging the menu for the Demand Forecast. And now we're sitting down at the meal. We finally get to enjoy the fruits of all the labor that's happened over all summer long. And so I'm really looking forward to diving in and hearing from the team about the Demand Forecast and all the different possibilities that we have, the levers that we have to decarbonize while we make sure that we have a safe, reliable, affordable energy system.

So thanks to Commissioner McAllister for his leadership through this whole process, and Vice Chair Gunda and Commissioner Douglas for all that you have done on the reliability side of the equation. I mean, what we're finding is that

everything is intertwined. And you know, for a long time, transportation was kind of sitting out there, I would say, separate from. They were not at the dinner table so much.

And now what we're seeing, you know, with -- especially with battery electric vehicles but also, arguably, with fuel-cell electric vehicles, this connectivity to the grid and to a lot of the core work of the Energy Commission. And I'm really looking forward to this integrated energy analysis that we're increasingly moving towards.

I mean, in our [AB] 2127 analysis, we found, you know, basically, a 21 to 25 percent increase in baseload electricity demand compared to today from the load in 2030 in transportation. And that's, you know, opportunistic load that we can flexibly use to help us achieve a reliable, clean energy system.

So looking forward to the discussion today and just thanks to the team for all the work to pull these together. We're sitting down to dine.

COMMISSIONER GUNDA: Thank you so much, Commissioners.

With that, I would pass it on to Heidi Javanbakht.

MS. JAVANBAKHT: All right. Thanks, Vice Chair Gunda.

Good morning, Commissioners, and everyone attending online this morning. Thank you all for joining.

I did want to add to the thanks that Vice Chair Gunda made a few moments ago to the Forecasting Team and add to that list Lynn Marshall and Alex Lonsdale who have also both been critical in pulling the forecast together this year, since we've had a couple staff out unexpectedly.

Can we go to the next slide, and the next one after that? Okay. Thanks.

So as Heather and Commissioners mentioned, the agenda for this workshop today has changed. The new goals for the day are to share results and ask for feedback on a couple of components of the Energy Demand Forecast, and then to provide an overview of the demand scenarios project and framework

So this morning, right after my presentation, Ingrid will present on the

additional achievable energy efficiency and fuel substitution results. You'll hear us referring to these as AAEE and AAFS. And that will take up the rest of the morning session.

And then in the afternoon, the Transportation Team will present their results from the Transportation Energy Demand Forecast. And then after those two forecast components, we'll have a presentation on the Energy Commission's new demand scenarios project and framework.

We were originally planning to present the end-user electricity and natural gas consumption and sales forecast results today. But again, due to some unforeseen challenges, those will instead be presented at the December 16th workshop, along with the hourly and peak forecast results.

Next slide, please.

So here's the timeline for finishing up the forecast. The IEPR team is aiming to post the draft report next week for comments. Due to the timing, and this is how it normally goes, the forecast results that we're presenting today and on the 16th will not be included in that draft

but we will add them into the final version which is posted in February.

The week after, as I mentioned, the electricity and natural gas end-user consumption and sales forecast results, along with the hourly and peak forecast results, will be presented at the IEPR workshop on December 16th.

After that, in January, we plan to post the final forecast results. And the final IEPR Report will be posted in February.

So transitioning now to talk about the forecast, why do we, at the Energy Commission, forecast demand?

So in 1974 the Warren-Alquist Act established the Energy Commission to respond to the state's unsustainable growth and demand for energy. As part of this Act, the Public Resources Code 25301(a) requires that the Energy Commission conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices, and that these forecasts occur at least every two years.

The cycle that we currently are working on is to provide a full update of the forecast

every two years. That happens in the odd years. And then in the even years, we do a partial update. So right now we're in 2021, which is an odd year, and we're doing a full update of the forecast this year.

The forecast is developed with input from stakeholders all along the way. Key stakeholders include the California Public Utilities Commission, the CPUC, the investor-owned utilities, and the ISO, the California Independent System Operator, as these stakeholders in particular use the forecast in various proceedings, such as the CPUC's Integrated Resource Plan process, and the ISO's transmission planning process.

Next slide, please.

These are the different components of the Energy Demand Forecast at a very high level. So the inputs along the top include the historic electricity and gas consumption, economic and demographic data, energy prices and rates, and committed energy efficiency programs and standards. These feed into the various models that we have for the different sectors. These sectors include residential, commercial,

industrial, agricultural, and transportation, as well.

And then in addition to those sector models, we have self-generation and additional achievable energy efficiency. And this year, we'll need to update this slide to include the additional achievable fuel substitution. So the self-gen and the AAEE and AAFS are components that reduce the demand. These all feed into a summary model to be rolled up into an overall end-user consumption and sales statewide, and by planning area. And then the step after that is to produce the hourly forecast.

And just to reiterate, again, today we're presenting on AAEE and AAFS, and that will happen next. The Transportation Forecast will be presented this afternoon. And then the output of the summary model, which is the Consumption and Sales Forecast, and then the output of the hourly model which gets us to the peak demand, those portions will be presented at the IEPR workshop on the 16th.

Next slide, please.

Throughout the day, you'll hear references to a low, mid and high case. We

forecast three different cases for demand, the low, mid and high, and that's to capture a range of uncertainty across different inputs and assumptions. The mid case is based on what we consider the likely assumptions.

The high energy demand case uses assumptions that result in higher electricity demand, so this would include higher economic growth, faster recovery from the pandemic, higher population growth, larger impacts from climate change, lower energy rates, higher adoption of electric vehicles, and lower adoption of self-generation technologies, so lower adoption of self-gen technologies means increased demand.

And then the low energy demand case uses assumptions that would result in lower electricity demand. So this case is based on lower economic growth and population growth, no additional climate change impacts, higher energy rates, lower adoption of electric vehicles, and higher adoption of self-generation technologies.

And then these cases get combined and adjusted with the appropriate additional achievable energy efficiency scenario, just depending on what it's being used for.

Next slide.

Some of the key updates that the Forecast Team made this year are outlined on this slide. So the first was using more recent economic and demographic forecasts that have been updated to include more recent data on the pandemic and related economic recovery trends. The AAEE portion includes updated potential savings projections. In addition, a new aspect called AAFS, additional achievable fuel substitution, was added this year which allows for better accounting of building electrification. And again, Ingrid will be presenting on both of these after my presentation.

And then this afternoon, you'll hear from the Transportation Team. They updated the light-duty vehicle model this year to use the 2019 California Vehicle Survey data. They also incorporated updated incentives and vehicle attributes.

The Self-Generation Forecast has a couple updates, so it incorporates the two-year extension to the federal Income Tax Credit for solar PV.

And then the net energy metering, or NEM

3.0, proposals were reviewed and also considered in the forecast this year.

And then for solar and storage, we also incorporated the Commercial Building Standard that was passed by the Energy Commission in August which mandates PV for new buildings.

Next slide.

So all of that was a very, very high-level overview of the updates that the Team made this year. More details around all these updates to the inputs, assumptions, modeling methodologies were discussed at various workshops, and Demand Analysis Working Group, or DAWG, meetings that were held throughout the year.

In particular, there was an IEPR workshop on August 5th that covered inputs and assumptions for a wide range of forecast areas. The Transportation Team has held several DAWG meetings this year to go over vehicle attributes, changes to load shapes, and some other updates. AAEE and AAFS were also discussed in more detail at a couple DAWG meetings.

All the presentations from these workshops and meetings are posted online and are

downloadable. So if you're able to get to this slide deck, there are links at the bottom of this slide that will take you to the IEPR workshops and DAWG meetings. You can also easily find the meeting materials by doing an online search for CEC DAWG or CEC IEPR and navigating to the days of these past meetings. But hopefully this table in this slide deck helps you narrow down and quickly find the materials for the forecast topic that you are interested in.

All right. Last slide, please.

So lastly, I wanted to quickly introduce our Demand Scenarios Project which, again, will be discussed in more detail this afternoon. So this project stems from the state's greenhouse gas emission reduction goals and a need to assess the potential impacts that different proposed strategies could have on energy consumption.

And so for this purpose, Staff are adapting forecast models to extend out to 2050 and defining high electrification scenarios which Mike and Anitha will go over this afternoon.

That's it for my quick introduction. With that, I will hand it back to Heather.

MS. RAITT: Great. Thanks so much,

Heidi.

So next, I think we can move on to Ingrid Neumann, and she's going to, as Heidi mentioned, talk about the additional achievable energy efficiency and fuel substitution. And Ingrid is our Efficiency Lead Specialist for the Energy Assessments Division.

So go ahead, Ingrid.

MS. NEUMANN: Good morning. Glad to see everyone here. And we're going to go over additional achievable energy efficiency, and our new product for the 2021 IEPR, the additional achievable fuel substitution.

Next slide, please.

Okay, so first, we'll talk about AAEE. And then second half of our presentation will be on AAFS.

So the Joint Agencies have a single managed forecast set which has been agreed upon for various purposes. It always has three baseline cases, as well as at least five scenarios of additional achievable energy efficiency.

The mid-mid AAEE forecast scenario is used for systemwide and flexibility studies which

are relied upon for procurement and transmission planning purposes, so these are for our statewide analysis. Then for local reliability needs, a more conservative scenario, the mid-demand low-savings AAEE scenario is used.

Next slide, please.

For 2021, we utilized the same savings accounting aggregation and extrapolation methodology and tools as were developed extensively for the 2019 IEPR. Historical data and potential savings projections were, of course, updated in all existing workbooks. And some new workbooks were added based on recent programmatic activities and data available.

Next slide, please.

So we did remove the fuel substitution workbook which was included in the 2019 version of AAEE. This is because the entire fuel substitution piece was supplanted by the additional achievable fuel substitution framework which we'll talk about in the second half of the presentation.

We did add some new workbooks. Some of these workbooks have both energy efficiency and fuel substitution components, and then they're

ascribed to those as appropriate. So we have the CCA and REN Program savings which are not yet modeled in the CPUC's Potential and Goals Study. Once those become modeled in the future, of course, we would remove that. We never -- we always attempt to not double count anything and account for these things.

Then we added new workbooks for Title 24 residential and commercial new construction that accounted for fuel substitution, as well as updating the energy efficiency components from that with the 2019 Impact Study on the 2019 vintage of the Title 24 Standards.

Then we added the Clean Energy Optimization Prog, as well as IOU Low Income Fuel Substitution and POU Fuel Substitution Workbooks. Both IOU Low Income Fuel Substitution and POU Fuel Substitution are not reported in their respective Potential and Goals Reports yet, so we modeled those ourselves.

Then we had a piece on SGIP heat-pump water heater incentives, as well as the statewide Tech and Build Program impacts modeled in those workbooks, and our own Food Processing Investment Program, or FPIC.

Next slide, please.

So this is the basic flow of the actual data integration from all of the sources. We have the CMUA's Potential and Goals Study. That's updated every four years, so we had a fresh-off-the-press version in the spring for the POU Potential and Goals.

Then we, of course, used the PG Study put out by the CPUC for the IOU Potential and Goals every two years, which is updated on the same cycle as our forecast is.

So those projections went from 2022 to 2032. Our forecast this year, the Baseline Forecast, and then the Additional Achievable Energy Forecast, as well as the Fuel Substitution Forecast, that are incremental to the Baseline Forecast go from 2032 to 2035. So we extrapolated the data from the potential -- IOU Potential and Goals Study out for those last three years. We did not need to do that for the POU potential savings -- or program-based potential savings because they actually provided their new savings out to 2041.

Then we have our own Beyond Utility analysis which includes a lot of the codes and

standards. It includes all of our Title 24 analysis and some of the Title 20 and Federal Appliance Standards. Some of the Appliance Standards savings, however, are modeled in the CPUC's Potential and Goals Study, which is why you see the vertical yellow and up and down arrow there. So we make sure that we take the best data source available for each one of those Federal or Title 20 Appliance Standards.

So then we take all of that data for the years 2022 to 2035, first year savings data, and make that cumulative and decay it out by the useful life of the end use. Then we can also do -- match that to the load shapes and attain full 8760 hourly results for every year of that forecast, and that's by utility or forecast zone, then sector, end use, and, of course, the scenarios that we have.

So next slide, please.

So for 2021 AAEE, we have six scenarios, similar to the six scenario that we had in 2019. The scenario definitions have changed slightly, not for the yellow Planning Scenarios 2 and 3, but for Scenarios 1 and 5. If you can see, the -- each of these scenarios starts with a mid,

so we're looking at the Mid Consumption Forecast there, and really focusing our variation on the savings component of the scenario.

So we start with our Mid-Mid Scenario 3, which is our statewide or kind of Business-as-Usual Planning Scenario. And then we have a little bit more conservative the Mid-Low Scenario 2, also in yellow. And then we have a Very Low Scenario, one which is a very extremely conservative viewpoint of what additional achievable energy efficiency can look like over the forecast period.

On the other side, we have our Mid-High Scenario 4, our Mid-Very High Scenario 5, and our Mid-High Plus Scenario 6. These are more aggressive or optimistic views of existing programs. And for Scenario 5 and 6, we're adding in potential programs that might start to exist and will provide -- could provide additional energy efficiency savings over the forecast period.

So the four main data streams for all of these scenarios are the IOU Potential Program Savings, the POU Potential Program Savings, Codes and Standards, so Title 24, Title 20, and Federal

Appliance Standards, and then the many Beyond Utility Program savings, that we're accounting for.

Next slide, please.

So these are our results for the electricity savings statewide for the Business-as-Usual Scenario 3, which is the Mid-Mid Statewide Planning Scenario. These are for 2022 to 2035. You can see that the purple wedge for Codes and Standards really is half of the savings.

So it's very significant, the work that the Energy Commission and the Building Standards Office is doing to support increased efficiency in Title 24, the work that the Appliance Standards are doing to support increased efficiency in appliances in the state of California in conjunction with Federal Appliance Standards that are starting to come back on track.

Then we, of course, have the Utility Program savings, both from the IOUs and the POUs, in the blue and the green wedges. And then all of the smaller programs, these Beyond Utility Programs, due add up to a significant slice here

in orange.

Next slide, please.

So the next slide has the same wedges here for gas savings, energy efficiency savings. And you can see that the IOU programs are the largest program here.

Next slide, please.

So here we're comparing the total statewide AAEE Mid-Mid Forecast to the same forecast adjusted from 2019. So the 2019 AAEE Mid-Mid or Business-as-Usual Forecast went from 2020 to 2030, so the traditional ten years. So we adjusted that savings to have a base year of 2022 and can compare that for those years that overlap here. The 2019 Adjusted Forecast is in the blue curve. And the 2021 AAEE Scenario 3 forecast is in the red curve.

You can see that they've very similar. So there have been a lot of changes in the underlying pieces that go into that and we will look at those next.

Next slide, please.

So that was for electricity.

Similarly here for gas, for gas it's a little lower. And maybe most importantly, you

can see that after 2030 there is -- it's no longer linear; right? And that's a trend that we see for most of our energy efficiency savings is that some -- the maximum potentials start being reached and it sort of asymptotically starts approaching a value.

Next slide, please.

So this is a comparison of the six scenarios that we had in 2019. Of course, those definitions varied a little bit because they did have some demand variation in there. For the 2021 scenarios on the upper right we only have the variation in the energy efficiency savings, so that gives a little bit more of a smoother spread between the different Scenarios 1 through 6. And Scenario 3, our Business-as-Usual or Mid-Mid Statewide Planning Forecast, is the one in red in the middle.

But it does -- there is a quite a bit of variation depending on if we take a conservative viewpoint of various savings streams or a more aggressive view, in maybe the purple, and then start adding some more potential achievable savings in the blue and the very aggressive pink Scenario 6 on top.

Next slide, please.

This will show us the same thing for the gas savings. And again, you can see that maybe the most important thing to note is, is that the gas savings do taper out in the out years. And this is just energy efficiency, not fuel substitution.

Next slide, please.

So this is our entire scenario framework for the IOU Program contributions. These are built around the CPUC's Potential and Goals Study. The Mid-Mid or Scenario 3 in the center in bold is the one that's voted on by the CPUC for the goals for the IOUs. So this is always the scenario that we start with as sort of our business-as-usual.

There are various levers that can be adjusted here, you know, how much emerging technology might -- emergency technologies might be utilized, what the incentive levels are capped at, you know, what the measure screening cost effective threshold might look like, what marketing and outreach engagement assumptions are made, you know, if they're default or if they're slightly increased for the then more aggressive

Scenarios 4, 5 and 6. You know, if we increase the marketing strength, we take a more optimistic viewpoint of what that could look like.

We look at maybe having the IOU Financing Programs being more broadly available to all customers. We increase the reference, behavioral retro commissioning and operating assumptions, the engagement assumptions there to be more of an aggressive value, and so on.

So then maybe most importantly, to kind of illustrate the variation in some of these scenarios, is we're looking at the cost effectiveness measure screening threshold. So that was, in 2019, for the 2019 Potential and Goals Study, that was 1.0. And of course, the entire portfolio for the utility must still meet that cost effectiveness threshold of 1.0 but individual measures can be less cost effective, all the way down to 0.85 for the 2021 Potential and Goals Study. So this was dropped to capture more available savings, you know, not -- you know, so that nothing is left on the table there.

And on the very high, the Mid-High Plus Scenario 6 on the very righthand side, you can see that this cost effectiveness threshold was

dropped all the way down to 0.75. Now with today's assumption, that might -- with the cost effectiveness test and all that sort of thing, that might actually result in portfolios that are not cost effective. But with the proposed changes with the cost effectiveness test, and thinking that some measures might become less expensive in the future, this is a possible, very aggressive viewpoint of a possible very high-energy efficiency scenario. That's kind of how Scenario 6 can vary from a Scenario 3.

Then for the low income piece, the Low Income Analysis of IOU rebate savings, this time came from the ESA decision goals, from the own -- CPUC's own low income rulemaking. and that was -- then more aggressive versions of that were varied out for specific years, as shown here, for the Scenarios 4, 5 and 6.

So next slide, please.

So the results of this analysis then for the electricity savings do show us that IOU Program savings have diminished from the 2019 Adjusted Forecast to the 2021 AAEE Scenario 3 forecast, so it's about 20 percent less for the electricity.

Then we can see where these things have changed on the next slide, please.

So this shows the main breakdown of the four types of pieces that go into the IOU Program savings. On the upper left we have the Market-Based Rebate Programs. And those are the ones where it became much more difficult to find cost effective measures to provide savings. So you can see that the red curve for 2021 really is about 50 percent lower than it was in 2019.

On the other hand -- and it's really a reflection of how good of a job the state of California is doing with some of these things. You know, a lot of the low-hanging energy efficiency fruit has been picked. And additional energy efficiency is achievable but it becomes harder and harder to attain.

So the IOUs have put more effort into the Low Income Programs. And the analysis utilized this time is based on the actual low income rulemaking, so it's, one could say, it's improved. And we can see then that the savings projected there on the upper righthand, in fact, are larger for Low Income Rebate Programs. So that's something that helps balance the

portfolio -- or balance the portfolio there.

Similarly, in the lower left, for the behavioral retrocommissioning and operational savings, we can see that these savings for 2021 are projected to be higher than they were in 2019. And that's because these were give -- they were really maximized. You know, they were brought to the forefront in 2019 and they were found to be a very good way of saving energy, cost effective and all that sort of thing, so those were maximized in the 2021 Potential and Goals Study.

On the bottom right, you know, there are less emerging technologies now as many of those previously emerging technologies have become mainstream, like LED lighting and heat pumps and that sort of thing.

So next slide, please.

This slide gives us a similar overview for the Gas savings from IOU programs. Those are more similar here for the 2021 and 2019 scenarios. And on the next slide we can see the breakdown from the rebate programs. You know, those are virtually identical for the Market-Based Programs in the upper right. They do

increase in the out years. And similarly, for the electricity savings, the gas and the emerging technologies have diminished for 2021.

Next slide, please.

IOU potential program savings, you know, still, even if the market-based rebate savings have decreased, they're still, you know, a big chunk of the pie here, and those are in red. Then the behavioral retrocommissioning and operational savings are also very large in green. The little sliver on top in purple are the emerging technologies. And then the blue piece at the bottom is the nice chunk that's coming from Low Income Rebate Programs. So this is for electric savings.

And then on the next slide, please, we have the same thing for the gas savings, and the distribution is similar.

So moving on to POUs. Thank you.

So this is our scenario grid for the POU program savings contributions. These are provided for each of the 38 California POUs. They did provide us those for all the years from 2022 to 2041. And the CMUA, as mentioned before, does this study every four years.

So the last study that we had was from 2017 and that was used for both the 2017 AAEE and the 2019 AAEE. So necessarily, the difference between the 2017 and 2019 AAEE couldn't be too different because it was based on the same underlying data. We could make some assumptions based off of POU interviews in the interim but we didn't have new data.

So what -- there is only one set of projections that was provided in the CMUA Potential Study. So in order to create the conservative and aggressive variations around that reference scenario provided to us, our team calculated sector by sector, so residential, commercial, industrial, and agricultural ratios from the IOU's Potential and Goals Study from their low TRC versus the mid TRC, that difference, and then the difference between the mid TRC and the high TRC, and applied those ratios to the reference EE's savings provided by the POUs to obtain the aggressive and conservative variations, so that we would have some variation to build into our AAEE scenarios.

So the result on the next slide, please, we can see here the comparison for the Scenario

3, the Mid-Mid sort of business-as-usual view here for statewide POU-based savings, those have diminished in 2021 as or with respect to the savings that were projected in 2019. And, really, that's not surprising considering the precipitous drop that, you know, existed in a lot of the other savings from 2017 to 2019. It's just that wasn't reflected in the POU savings in the same way because there had been no underlying data, you know, because that's only done every four years.

So just as the IOUs are finding it more difficult to find cost effective savings, energy efficiency savings, the POUs would find the same things since they try to model their own cost effectiveness approaches is very similar to that that the IOUs use.

So next slide, please.

So this is our scenario grid here for the pieces that go into the Codes and Standards AAEE savings. And like I mentioned before, there are three main bundles there, the Title 24, the California Building Standards, Title 20, the California Appliance Standards, and then the actual Federal Appliance Standards.

So for Title 24 the 2019 vintage of the Building Standards is currently on the books and that's included then in our Baseline Forecast. The 2022 vintage of Title 24 was recently adopted but it has both energy efficiency components, as well as electrification components, and wanted to account for those separately in our AAEE and AAFS, and we've done so. So the 2022 Standards are contained -- those would go into effect in 2023.

So depending on whether a builder chooses to comply with those standards along a partial or complete electrification pathway, you know, that would be captured in the AAFS portion. But if they choose to comply with the simply higher efficiency pathway for the parts that they've done, this is captured in our AAEE.

So the 2022 Standards are included in all of our scenarios from Scenario 2 up. And the variation then is the amount of compliance rates. So one might consider that compliance with newly adopted or newly in effect standards then in 2023 might not be as stellar as they might be in a few months or a few -- a year down the line as builders and inspectors learn these standards.

And then, of course, you can simply take a more optimistic viewpoint of, you know, what a reference compliance rate be and say, you know, maybe this time, due to additional education and outreach, this implementation of the standards is going to be better. So that's under the variation that we have across the Scenarios 2 through 6, making them more conservative or more aggressive.

Then in the Mid-Mid Scenario 3, we start adding a conservative viewpoint of what the 2025 vintage of the standards might look like. There are some ideas that the team is starting to work on the 2025 Standards so that the Energy Commission Building Standards Office is starting that process. And you know, the 2028 Standards aren't included into our Scenario 4 because those are going to be a lot more speculative. And we haven't included anything beyond that because it's fairly unknown how those Building Standards -- you know, what those will look like past that three-year cycle in 2028.

So similarly for Title 20 and the Federal Appliance Standards, we do include -- you know, our Baseline Forecast includes like everything

that's on the books in 2021, and does include some things that are, you know, just finishing the rulemaking process and pretty -- you know, it's very firm that those things will be occurring. And then we include some things in our Scenario 3 that are going to probably occur, right, and we might do this at a 20 percent compliance rate reduction to be more conservative, and then we can ramp that up over time.

And in our Scenario 6, which his the most aggressive or optimistic viewpoint, we would take all of the measures that have been modeled for various Appliance Standards that could occur; right? So there's even some measures in there that right now are proposed as being voluntary but even a portion of those savings is likely to occur at some point.

And then with the Federal Appliance Standards, those are coming back online. And you know, they might not be occurring exactly when we thought they were originally going to occur because of some of the delays there but we rolled out those savings and delayed those by a few years because they are still, you know, on this

list of things that the Federal Appliance Team is going to tackle.

So let's move on to the next slide.

And here we're showing the range of the scenarios. The bottom left shows our 2019 AAEE range for Codes and Standards. And there you can see more definitively the ratchets of Title 24 because we didn't include them in some of the lower, the more conservative scenarios, because at that time the 2022 Standards were still just in the works. It was not quite as developed as maybe even how we're thinking about the 2025 Standards right now.

You know, it was a big transition from, you know, pure energy efficiency to, you know, more of a broader building decarbonization view, so that's why we don't see these ratchets as clearly in the upper righthand graph, which is showing our range of scenarios. And we did not show one because there weren't any additional Codes and Standards included in Scenario 1.

So 2 through 6, 3 being the one in red which is our Mid-Mid sort of reference, business-as-usual, this is our best guess at what things might look like given our information today.

And that did include some conservative assumptions about the 2025 Building Standards. And then the 2028 Building Standards are included starting with Scenario 4.

So next slide, please.

So those were for the electricity savings.

The next slide shows us the same thing for the gas savings. Again, the most notable thing here is to see that, really, the gas savings are going to, you know, cap out at some point. You know, this isn't going to be -- gas energy efficiency isn't what Title 24 is focusing on any more today. You know, it's more of a broader electrification focus. Those are our cumulative savings that are being captured here.

So next slide, please.

So these are for both the Federal and the Title 20 Appliance Standards. These are, you know, smaller numbers. There were a lot of interactive effects in 2019 that -- and the, of course, in 2019 for the lower left-hand graph, we also had the variation in demand, and sometimes those caused some of the curves to almost lay on top of each other or cross, like you see. We

didn't have that for the 2021 AAEE because this is all focused on savings.

So the Appliance Standards were included at a conservative level for Scenario 3 here because all of the stuff that's on the books was already included in the Baseline Forecast, so that's the red curve. And then the purple, the blue, and the pink are the more aggressive or optimistic versions of those Scenarios 4, 5 and 6. So this is for the electricity savings.

And then on the next slide we'll have the gas savings due to Appliance Standards, okay, so those are shown here. We did still see some gas savings in the outyears. And that may change as the focus might change with the Federal Appliance Standards, as well. But for this time we still included that modeling because it is a possibility for Scenario 6.

Moving on to the next slide, so this is the last slice or, you know, data bundle here of savings, our Beyond Utility AAEE scenarios savings. And here we have a whole collection of individual workbooks that capture savings that are not being captured elsewhere.

So we kind of bundled them into various

groups with the first three, you know, like the Prop 39 which, yes, it is going to come to an end but we have -- you know, that data is very firm. It's an established program. We have historical performance data. And we know that the future funding allocation, of course, for Prop 39 isn't there, but for DGS and ECA (phonetic) and that sort of thing, it is, so those were well known. And so we used our reference energy efficiency projection savings there for all Scenarios 1 through 4, and an aggressive version for 5 and 6.

So I should mentioned that the Beyond Utility components are designed to have three different variations, sort of a reference, then a more conservative version of that reference and a more aggressive reference of that. And then we could assign those to our specific AAEE scenarios.

So then the next bundle of five or so workbooks there, including the new CCA and RENS through the PACE financing, that is something where, you know, we do have historical data but it's a little bit more limited, had to make a few assumptions as to what those savings might look like. So we did use the reference savings for

the statewide Scenario 3, but we used a more conservative version for Scenario 2. And then, of course, for Scenarios 5 and 6 we used the aggressive version.

Then the third bundle here with the POU BROs savings that weren't modeled, this time the POUs did give us some BROs Program savings in their Potential and Goals Report from the CMUA. And those then were removed from the projections that we were otherwise making because, you know, some of these programs exist but they're not being reported on specifically in the CMUA Report.

So similarly, you know, smart meter, some of the SGIP heat-pump water heater incentives. And you know, these are smaller, maybe pilot programs, something that we have a little bit less firm data on. So we took a conservative estimate there, starting from our Scenario 3, and then did use the aggressive always for Scenario 6.

The last bundle that's in a little bit more of a salmon or pink bundle, that includes more speculative savings. So these are savings that are technically achievable but there aren't

always very -- you know, there are limited programs that are actually motivating those savings to occur, but there might -- they might come to fruition as programs, more programs like them, are being developed.

So this is sort of what we're using for our, you know, optimistic, aggressive Scenarios 4, 5 and 6 in looking at, you know, there are these potential savings. And really the question is then: How much of them will be tapped and realized, depending on how things develop throughout time?

So the results are on the next slide.

So these are for the electricity savings from all these Beyond Utility Programs. We do have a nicer spread here in the upper righthand side from the 2021 AAEE portion than we did in 2019 because we had, you know, we had more programs, we focused more on the variation of savings, or really focused only on the variation of savings, and we got a little bit more granular into what programs really belong into what AAEE scenario. Again, Scenario 3 is the one in red towards the bottom of that curve.

Next slide, please.

So this is the same for the gas savings from the Beyond Utility Programs. Some of these programs, of course, like I mentioned, like Prop 39 and such, are ending. Some of the programs are pilot programs that only exist for a few years. And so then, even for an aggressive scenario, those programs simply end, so when -- we wouldn't have additional first-year savings after a certain point, and that's why everyone sees that tapering out, other than the fact that gas maybe might not be the focus of all of these programs anymore.

Next slide, please.

So now we're going to move on into our additional achievable fuel substitution, which we've called AAFS, and this is a new product for 2021.

Next slide, please.

So for 2021, we developed additional achievable fuel substitution as an annual and hourly load modifier to the Baseline Demand Forecast. We used a manner similar to the one which was developed for AAEE, so we tried to use AAEE as a template for AAFS. But AAFS was conceptualized as being separate for AAEE, so we

would put all the energy efficiency savings in AAEE and the electrification of fuel substitution impacts in AAFS.

Next slide, please.

So the development of the 2021 AAFS was a little bit more rapid than the development of AAEE was, simply because we could model it after AAEE already. That load modifier already existed.

We did present our thoughts and our work and took feedback at the DAWG stakeholders workshops on June 23rd and September 9th, as well as at the IEPR Commissioner workshop on August 5th.

So our goals as for AAEE and our goals for AAFS are also to continue to focus on firm programs and projections since we think that the core scenarios might be used for planning and procurement purposes, just as they are for the AAEE Forecast.

So as in previous iterations of the AAEE Forecast, for AAFS, we also attempted to develop variations around the most probably futures to show other possible outcomes given either less or more effort input to realize the potential of

existing or proposed fuel substitution programs in the same way as we did for energy efficiency programs.

Next slide, please.

So this looks probably a little familiar; right? We have the same four sets of data streams, you know, the IOU Potential Programs, POU Potential Programs. And here we're looking at, you know, fuel substitution or electrification programs, or portions of programs that have those types of impacts. Then Codes and Standards impacts, that was limited to Title 24 this go around, and some Beyond Utility Program impacts.

So we're calling this impacts because for fuel substitution, if we are to provide the same service to the end user, we are displacing gas, so in some sense one could say you're saving gas, but you are actually going to be adding electricity. So it's a negative electricity savings if we're looking at that from that savings perspective, so that's why we wanted to call this impacts rather than savings because that can get a little confusing.

So we've kept the Scenario 3 here, the

Mid-Mid or sort of Business-as-Usual Scenario 3, and think that this is our best representation of what things might look like based off the programmatic data that we have collected. So then the Mid-Low Scenario 2 has less fuel substitution penetration, whereas the Mid-Mid Plus Scenario 4 has more fuel substitution penetration than the Mid-Mid Scenario 3.

So if you're actually going to think about what's more conservative from a grid planning perspective, one might think that, you know, having something that necessitates load growth, such as fuel substitution does, you know, estimating a slightly higher fuel substitution penetration would be a more conservative planning scenario.

So then you also might notice that there is no Scenario 1. The idea was that the -- since Fuel Substitution Programs are just emerging, you know, there's a lot less or sometimes very little historical data there, there's more uncertainty, and the actual impact amounts currently are smaller. So that's why we thought a low version of the fuel substitution impacts made sense and very low might not, so we did not have a Scenario

1.

Then for Scenario 4, we called this Mid Plus because it's really just an aggressive view of what the business-as-usual piece might look like.

And then we started getting into -- for Scenarios 5 and 6, we wanted to add some more speculative contributions for what kind of fuel substitution could come online, you know, but isn't, right now, motivated by any existing programs, like there's no mechanism for making that happen yet. So that's why we have some variation in the names there.

So let's go to the next slide.

So this shows our negative savings; right? So this is the added electricity due to programmatic fuel substitution efforts in the Mid-Mid or Scenario 3 Business-as-Usual AAFS. The Title 24 fuel substitution is that portion based on the electrification motivated, starting with the 2022 vintage of Title 24.

Then we have the big blue wedge here with the IOU Fuel Substitution Programs. Those were -- the Fuel Substitution Programs were included in the CPUC's Potential and Goals Study

this time. And then we added the low income portion because that low income portion wasn't included with the Potential and Goals version this time.

So similarly, we modeled the POU Fuel Substitution Program impacts, as well as from the smaller different workbooks here that are the Beyond Utility components in orange.

So that's for the electricity side where we'd be adding some electricity due to fuel substitution.

And then on the next slide, this is showing the gas that would be displaced by those programs. So that could be, you know, called a gas savings for that state -- the Mid-Mid Statewide Scenario 3 Forecast.

All right. Next slide please.

So in 2019, we did have a very small speculative contribution due to all-electric new construction, so some sort of penetration of all-electric new construction that could be motivated by things like local ordinances or other such efforts. And that was included within our 2019 AAEE Forecast. So this is what you're seeing. You're seeing that adjusted value here for the

electricity for 2022 to 2030 in the blue curve.

Then for our 2021, which is the first time we have our AAFS proper, that Business-as-Usual Mid-Mid Scenario 3 Forecast is shown in red. So even the programmatic contributions that we have projected now in our Business-as-Usual Scenario are quite a bit larger than what existed in our speculative contribution to fuel substitution hidden away in AAEE in 2019.

So then on the next slide we can see that here, also, for the gas, right, the gas savings then, of course, are also larger, or the displaced amount of gas due to fuel substitution with the programmatic impacts is larger than it was with the -- it was a 1.5 percent of new construction annually, all the way up to 16.5 percent in 2030 that was included in the 2019 Standards.

Okay. Next slide, please.

So this is the contribution from the IOU Programs, the IOU Fuel Substitution Programs that were included in the Potential and Goals Study in 2021. Again, the Mid-Mid Scenario 3 are the parameters that were set for the adopted goals for the fuel substitution measures, you know, the

cost effectiveness measure screening threshold, and so on.

The only piece that didn't come from the Potential and Goals Study here is the lighter blue row here with the IOU Low Income Fuel Substitution Program contributions because, like I said, that wasn't included in the modeling this time per the 2021 PG Study. That was based on filings from the Low Income Programs that SCE was running and extrapolated out to the other IOUs.

Next slide, please.

So this gives the breakdown of the IOU electrification or Fuel Substitution Program savings. Most of this is coming from Market-Based Electrification Programs. There is a red sliver here in the bottom from Low Income Fuel Substitution. So this is for the electricity impacts; right? It's negative because we're actually adding electrical load with fuel substitution.

Next slide, please.

So these are the gas impacts that we would see from IOU program contributions and, again, the Market-Based in blue, the Low Income in red.

Next slide, please.

So for the POUs, we extensively interviewed all willing POUs that we reached out to. We ended up relying on preliminary pilot program data from LADWP, so many thanks to them to provide us this data on their Electrification Programs and projections. And then some data from SMUD who -- and Pasadena and Palo Alto. They had some cost projections, number of participant projections, and there were some estimated fuel, future GHG reductions. So combining all of these things, we had the core data set from LADWP and then could apply a delay or a head start to the other POUs relative to LADWP's fuel substitution timeline.

So we could vary then the fuel substitution impacts from low to high, as well as the uptake rates of these Fuel Substitution Programs from low to high, to create the five scenarios of POU -- or five scenarios of POU fuel substitution contributing to AAFS in 2021.

Next slide, please.

So this is the spread of those scenarios. Scenario 2 starts at the very top. Scenario 3 is our Mid-Mid reference, kind of Business-as-Usual

Scenario in red. And then it becomes more aggressive with more fuel substitution and, therefore, more incremental electricity added in Scenarios 4, 5 and 6.

Next slide, please.

These would be the gas components that -- or the gas pieces that would then be displaced for the POUs that would come from the corresponding IOU gas providers unless you're Palo Alto.

And next slide, please.

So then we move on to the third portion here with the Codes and Standards which was focusing on Title 24. As mentioned before, the 2022 vintage of Title 24 Standards did focus on electrification, the prescriptive requirements, encouraged -- or the prescriptive requirements had electrification of one end use depending on building climate zone for residential construction. They also had some requirements for commercial construction. For residential, those could be avoided in favor of additional energy efficiency depending on what the builder chose to do. For commercial, some of those could also be avoided.

So the total fraction, of course, of new construction would have to add up to 100 percent. But approximations are -- estimations were made as to what percentage may be based off of cost effectiveness and such would be partially or completely electrified buildings, either new construction or additions and alterations, and that went into a FS, and then the other percentage that would comply with the -- under the increased energy efficiency piece would go into AAEE.

So the breakdown is, again, the same where in the 2022 Standards are incorporated for all AAFS scenarios here because those are, you know, on the books. We have a good idea of what those are. We know what they're going to look like, I mean, the regulation has been adopted. But the impacts thereof, basically, what percentage will choose to go, you know, do the partial or complete electrification versus what percentage will choose to do higher energy efficiency, right, that is yet to be seen, you know, as those buildings are built starting in 2023.

So then the 2025 Standards, of course,

have just started underway, so those are included in a very conservative way starting in Scenario 3. And the 2028 Standards begin to be included in Scenario 4.

So next slide, please.

So these are the electricity impacts on the Title 24 fuel substitution. Again, of course, they're negative because we're adding electric load when we have electrification of buildings, partial or complete.

So next slide, please.

This then is the gas displaced. I apologize for all those extra zeros. The number, it's 350 is the maximum on that vertical scale, MM therms, so don't get too excited. It is a fair amount of gas displaced but is a period, not a comma there, it's a decimal. And it just looked very odd but it was too late to change it.

All right. Next slide, please.

So this gives us our last slice here of the AAFS scenario contributions. The top grid includes the individual workbooks, you know, the CCA and REN fuel substitution impacts from those programs, local government ordinances where, you know, there are quite a number of local

governments that are requiring all-electric new construction or electric, you know, all-electric for specific end uses, you know, and that sort of thing.

Then, of course, our Build and Tech Program where, you know, there is some uncertainty exactly what those impacts will look like but, of course, it's funded. It is going to occur. You know, it's all included here in our AAFS in the same type of variation where we bundled those two, what we know very well, right, in the top rows, in the middle section what we know, have a little bit less historical data on or maybe only funding information. And the question then is exactly how that funding is going to translate into impacts?

Then the industrial and ag pieces in the more salmon color, those are a little bit more speculative, just like they were for the energy efficiency portion.

And then we are proposing for our Scenarios 5 and 6 for AAFS to add some additional speculative fuel substitution using our Fuel Substitution Scenario Analysis Tool. So this is a technology-based fuel substitution and it's

very much looking at, you know, what's technically achievable. And then one would have to consider what types of programmatic efforts might be actually necessary to reach various goals that we might design those scenarios for, whether they're a 2030 goal or a more long-term midcentury goal.

Next slide, please.

So this gives us only the programmatic contributions for the Scenarios 2 through 6 for AAFS from the Beyond Utility fuel substitution. There's no additional technology-based fuel substitution included here yet, so that would be more speculative and would be designed to meet some of these aggressive goals that our state has.

Next slide, please.

This is the same picture for the gas impacts of programmatic fuel substitution as captured in the Beyond Utility Programs, so no additional speculative portion included here yet.

And next slide, please.

So we've added this additional load modifier. The AAFS, or additional achievable fuel substitution, so we might need to revisit

our comments at forecasting agreement language after it's been determined what various agencies and their stakeholders actually end up using and for what purpose.

Then as we do this, we need to consider which combinations of AAEE and AAFS scenarios are compatible with each other given the total gas displacement potential, as well as program funding sources; right? Because if you're funding a Fuel Substitution Program, you might not be funding a Gas Energy Efficiency Program.

So right now the programmatic contributions to AAFS are still small enough that they don't appear to cause any issues with the gas energy efficiency that we currently have, but that can change in the future, and it certainly can change for the more speculative scenarios that we would design for Scenarios 5 and 6 that are more focused on various policy goals in that high electrification future.

So last slide.

Thank you very much for letting me tell you about our work on the energy efficiency and fuel substitution load modifiers to the Baseline Demand Forecast.

COMMISSIONER MCALLISTER: Great.

COMMISSIONER GUNDA: Thank you, Ingrid, for that excellent presentation. I just want to begin by just kind of noting a couple of things.

One, you know, the kind of AAEE analysis is always under a compressed timeline, given the different pieces coming together. And I know you've been putting a lot of time on this particular product to make it happen. So first of all, just congratulations for just getting this done and put together for commenting, so just wanted to acknowledge your incredible contribution.

Second, I wanted to comment, is this is -- I mean maybe it's just me seeing these presentations over and over and then my brain is slowly beginning to grasp the detail. But this is -- this was really well structured in terms of the different components, how you kind of laid them out, both from the different measure buckets, but also the different scenarios. So I found it extremely helpful in the way you laid it out and the presented it. So just, again, wanted to note your contribution in making this information accessible to the broader audience

because that's an important element of the public process, so thank you for that.

A couple of questions. I mean, there's a ton. There's a lot to digest here and it's hard to kind of go into all the pieces. But just at a very, very high level, I've got a couple of questions.

I started the first one. Given that there is a huge amount of potential funding that might be coming through, you know, our new revised budget or, you know, the new budget for 2022, there was some preliminary indications of a pretty large energy budget and some money for, you know, kind of the building decarbonization and such, and also the federal stimulus, are we looking at those impacts in any of our scenarios or is that something we want to just wait for the next year?

MS. NEUMANN: So we're looking at funded or, you know, programs that were under discussion when we started this work, you know, early this year. Then as far as, you know, some of the speculative pieces, you know, for industrial and ag and, you know, some of the things that the POUs might have been telling us that they're

planning on in the future, right, when we look at those very aggressive Scenarios 5 and 6, there is this component of, you know, there is -- there's technically achievable potential but it's unfunded; right?

You know, so we didn't really look at -- we don't have dollar amounts that would be required to fund that; right? That's not a dimension that we have in our analysis yet. But one could maybe, you know, think that, well, if there is so much additional funding, one could think that these are places where it could be applied and start reaching some of those impacts.

COMMISSIONER GUNDA: Great. So implicitly, you know, in some of our aggressive scenarios, there is that kind of motion that we try to capture in terms of what additionally can be done while we don't have the mandated funding at this point. Great.

So kind of a second question just on the AAFS specifically. As we look through some of the statewide versus, you know, both on the gas and the electricity side, are there any kind of comments from stakeholders in terms of, you know, the levels that we're capturing here? I mean,

like what did we hear from the stakeholders in terms of their comfort in the design of the scenarios? But, also, if you could just kind of help set this up in contrast to some of the 3232 work we've done, you know, whether the, you know, AAFS numbers that we have in the Mid-Mid case here are -- you know, what level are they with the 3232 goals at this point?

MS. NEUMANN: Yeah. So that's, I think, that's kind of ongoing work. And they are less and -- I mean, they're certainly less for the Business-as-Usual case. It looks like maybe some of the programmatic pieces that we have all the way up to Scenario 6 might be getting close to some of the minimal goals; right? But this is still very preliminary. We haven't quite flushed that out.

And there was something else you said.

COMMISSIONER GUNDA: Yeah. In terms of the stakeholder input on that --

MS. NEUMANN: Oh, right.

COMMISSIONER GUNDA: -- By using this yeah.

MS. NEUMANN: Right. So I think, especially with the POUs, there were a lot of

plans to have additional fuel substitution programs come online but it was a little -- it felt a little bit more speculative than this is a goal, this is certainly what's going to happen. It's like these are things we are working on but then, of course, it has to pass through their boards and things like that. So we included some of those in the most aggressive cases.

And then I think a general sentiment from some of the utilities that we've spoken to is that it has become harder and harder for them to attain some of the energy efficiency goals, and that even, you know, even though we see that the Potential and Goals Study is dropping the amount of energy efficiency that they might expect an IOU to be able to achieve, right, as far as setting the goals for them, the IOUs are still struggling to do that. They do seem to see some more potential in the electrification programs. But then their analysis on that is, also, fairly new.

So we'll be in contact with them, and a lot of checks and balances, I think, over time.

COMMISSIONER GUNDA: Yeah. Great. So I should probably know this but I do not, and I

apologize for this basic question here, to the extent in our AAFS, do we consider the impacts of future RNG, or hydrogen and such, impacts or we don't at this point?

MS. NEUMANN: No. No. This is displacing pipeline natural gas by electrification. This, no, it's not that broad of an approach. It's really, you know, what programs exist now. I mean, there are some of -- there are some other programs, I forgot the name of it, but in the Central Velley, like switching propane to electric, you know, that sort of thing. But then that's not displacing gas, so it's a little bit -- it's more fuel switching than fuel substitution.

But if something like that were to become more statewide, right, that would, of course, add electric load and we would want to include that in some way in our forecast.

And then I suppose probably talk a little bit more to the gas people about how to deal with RNG if that -- if something like that comes to fruition. I mean that, again, is a little different because you would still be, you know, taking RNG, right, whether you're mixing that

into the pipeline or not, but you wouldn't be adding electric load. So I'm not sure if that has the same kind of place in this kind of AAEE/AAFS analysis. I mean, it seems like the -- if we're doing --

COMMISSIONER GUNDA: Right. Right.

MS. NEUMANN: -- a fuel switching, sometimes that could be important because we do need this for planning and procurement purposes; right? So then one would need to know if added electricity is being added. So whether one might all that something different, who knows, but right now --

COMMISSIONER GUNDA: Great. Great.

MS. NEUMANN: -- it's not included.

COMMISSIONER GUNDA: Awesome. Thank you, Ingrid. We'll catch up with you with more questions, but I'll pass it on to Commissioner McAllister or Commissioner Monahan.

COMMISSIONER MCALLISTER: All right.

COMMISSIONER GUNDA: Yeah. Commissioner McAllister?

COMMISSIONER MCALLISTER: Great. Yeah. So thanks, Commissioner Gunda. And you already asked a couple of the questions that I want to --

would ask. And it actually gives me the opportunity to dig in a little bit more, so thank you for that.

Let's see. So thanks again. I'll just reiterate, thanks for this analysis. And you know, this is a great structure to approach these issues and give them some rigor. And, you know, and that's what we have to do with the forecast; right? Because this is all about having scenarios that are sort of within the bounds that, you know, allow us to not -- to underpinning reliability. And you know, this is part of the forecast; right? So this goes out into the world and actually has an impact.

And so I think it's worth pointing out that the team that does this work is very much -- kind of has like an accounting mindset, you know? You're sort of you'll believe things when you see the data that supports them; right?

And so that's, you know, that's a rock-solid foundation for our policies going forward in terms of, you know, discussing across the various agencies, you know, settling generally on the Mid-Mid Scenario and some different versions or, you know, iterations on that, a little bit on

either side in terms of, you know, what we're going to use for the forecast.

And so I want to just sort of appreciate that fact that, you know, this modeling is really -- you know, the staff makes every effort to ground truth anything that goes into the modeling.

And so having said all that, you know, I want to just highlight the fact that we have incredible urgency to pivot our buildings. And so the FS, the AAFS, and the AAEE, you know, our strong hope in all of the work that, you know, many of us do here at the Commission is really aimed at moving the needle toward low-carbon technologies in particular and, you know, highly, as part of that, highly efficiency technologies; right?

And so, really, I wanted to focus a little bit on the Scenarios 5 and 6. And Vice Chair Gunda already brought up the AB 3232 work. I want to ask, was there some consideration or did Staff talk about doing an actually AB 3232 scenario, you know, sort of saying, okay, now that we know and we've done all this modeling in, you know, the Assessments Division and put

together with the Efficiency Division the AB 3232 Report, the legislature asked us what it would take to get our buildings by 2030 to 40 percent below 1990 levels of carbon emissions; right?

And so that really begs a couple questions. One is, did we sort of look at that, the answer, right, which was basically heavy electrification, even across many of our existing buildings; right? And so wanted to sort of get your view of whether that was considered and how that could be done.

And then, also, you know, I think since we're both interested in efficiency and sort of the forecasting and, you know, the electrons and, you know, gas molecules going through our energy systems, we obviously have to be, you know, interested for forecasting purposes in, you know, kilowatt hours and therms. But we also have to be interested in the carbon piece of that.

So I'm wondering if, you know, one output of this could be, okay, this scenario actually has the following carbon impacts. So I think, you know, sort of make that an outcome. Maybe it's informational. But I think it's very important to be able to compare and contrast some

of our scenarios.

So there are really two questions. One is 3232 specifically. And the other is, you know, the possibility of adding some carbon metrics to our forecasting outcomes.

MS. NEUMANN: Yeah, so I think all of this is -- that is ongoing work; right? We were focusing on the forecast proper, you know, so the energy system impacts.

And then as far as, you know, an AB 3232 scenario, I think that is an ultimate goal to have something like that. Because the idea was, well, we have these speculative -- you know, we have this idea of having some speculative AAFS scenarios because, you know, there's only so much that you would augment existing programs by; right? But we know that more technology substitution can exist; right? So we wanted to see, you know?

But then we need to integrate the actual programmatic contributions that we already have once those are maximized. And we need to subtract those from possible end-use-based gas that still exists for additional fuel substitution; right?

COMMISSIONER MCALLISTER: Yeah.

MS. NEUMANN: So that's the piece that we're still trudging through. And we have some preliminary work done on that. And I think it will -- you know, some of this is going to feed more into our, you know, long-term demand scenarios and we can look at that.

I mean, it's interesting, you know, that you said with the GHG impacts because you can't really compare. You can't really have an AB 3232 scenario because it's one that's based off of GHG goals, not energy goals, until you do that conversion; right? So we sort of have a rough back-of-the-envelope one where it looks like maybe our maximized programmatic contributions all the way up to 6 get us there, right, but it's a back-of-the-envelope calculation right now, so --

COMMISSIONER MCALLISTER: I think that's mostly true. I mean, I think there's -- it's mostly just math, except for maybe the piece of, you know, speculation about how much RNG or non-fossil gas, you know, might be in the gas grid. But we pretty much know what the trajectory is for electricity, carbon content, and most of our

gas content, or at least enough to make some --

MS. NEUMANN: Right.

COMMISSIONER MCALLISTER: -- valid assumptions.

So I would, you know, I would encourage that. So I think the scenario isn't that hard to translate into energy terms from the carbon terms, but thanks. I appreciate it.

I do really appreciate the fact that, you know, you need to sort of -- part of the question really goes to how much market transformation we're going to get; right? Because once we get the market moving in the direction that it needs to, to decrease carbon, then there aren't going to be programs. You know, much of the activity will be out there in the marketplace with no programs at all. It will just be happening.

And so I think appreciation of that market transformation kind of urgency and goal that we have I think is something. Admittedly, it's difficult to put into a forecast where you're trying to ground truth everything. But I do think it's absolutely the way markets have happened in the past in California for solar and, you know, many, many technologies.

And so if we don't at least try to capture that, we're going to miss it. And, actually, we're going to see this accelerated trend that we haven't accounted for in the forecast. And, obviously, it's hard to tell when that would happen or if it would happen.

MS. NEUMANN: Well, and that's really interesting --

COMMISSIONER MCALLISTER: I think it's worth --

MS. NEUMANN: -- right?

COMMISSIONER MCALLISTER: Yeah. I mean, that's kind of the California model, you know, is that we end up sort of marshaling marketplaces to do much of the work over the long term themselves without, you know, getting the ball rolling with policy and funding and programs; right?

MS. NEUMANN: So what you said reminded me of another thing that we're looking at. So the CARB, right, so CARB put out their State Implementation Program where they saying that -- and some of the Air Quality Management Districts had spoken to us about this maybe potentially happening earlier in the summer, you know, that they wanted locally to have bans on equipment

that's sold, you know, based on NOx emissions; right?

And what might happen then would be that if, you know, the NOx limitations are at this level, that you're, essentially, requiring all-electric equipment; right? And if that occurs, not just locally but statewide, then you could -- you know, and that's proposed in CARB's SEP Plan to occur in 2030. So then we've seen some things where, if you did that, then all of a sudden you would just have everything all-electric, never mind, you know, codes and standards or incentive programs, like you mentioned, and it would just take off then.

COMMISSIONER MCALLISTER: Exactly right.

MS. NEUMANN: And you know, so then we were thinking about building a scenario that looks like that, as well, you know, sort of in that --

COMMISSIONER MCALLISTER: Um-hmm.

MS. NEUMANN: -- aggressive range. I mean, when -- I think there's some speculation as to, you know, how, you know, if this will actually occur or to what extent. You know, is it -- how is it going to ramp up? So we were

thinking about --

COMMISSIONER MCALLISTER: For sure.

MS. NEUMANN: -- doing that kind of thing, too, and seeing what that could look like and where that could go.

COMMISSIONER MCALLISTER: Well, that would be really -- that would be really interesting. I mean, we are seeing that we're going to need to use jurisdictions across all the agencies. You know, it's not just about Title 24 Building Standards. You know, that's a very specific set of authorities that we have.

Air quality and the State Implementation Program -- or Plan at ARB, you know, that will be focused, probably, on the nonattainment air districts, right, which are much of the state. And so that, you know, in Part 11 of the Building Code also has a lot of thinking going on about how that's going to work going forward.

So I think these scenarios, although they sort of, from the modeling perspective, they still seem -- you know, they're not actual programs that are actually, you know, 100 percent certain. They are actually likely to occur in some form, I think.

And I'll just point out, you know, this market transformation may happen more quickly than we thought. I mean, I don't know if folks saw the news about Tejon Ranch that came out yesterday, but they finally reached an agreement to build almost 20,000 units down in Southern California around the Tehachapis. And that project will be all-electric and zero-carbon. And so that's a massive development that will be really moving markets. And I'll -- there's an *L.A. Times* article that I just put in the chat there but -- oh, actually, just to the panelists. Maybe we can put that -- make that more public. Sorry about that.

But so I think, you know, we will be seeing this trend kind of moving forward as people try to figure out solutions for decarbonization.

I'm talking too much but I think, you know, I want to just really encourage us to think about how we do these more aggressive scenarios.

And I want to encourage everyone online. I mean, we've got 120 people or so listening in. You know, the attendees are obviously committed to this conversation and getting it right as

well. And so I want to invite them to bring sort of places where some more -- you know, some deeper thinking or more possibilities about what may be happening in the not-too-distant future so that we can start to build scenarios that are a little bit, you know, outside the box.

And then we can figure out how to sort of lay them out in the spectrum of scenarios and how we present to those to the world as part of the forecast or not. But I think there's a lot of really positive movement there.

And as Commissioner -- or as Vice Chair Gunda said, you know, it's likely we will get some resources to, you know, fertilize the terrain here and, you know, support, whether it's local governments or, you know, loan, you know, guarantees or interest rate buydowns and things like that, where we can really get out there and move some capital. And once the capitalists put some money here, and there's a lot of capital floating around out there, then that's -- that could really move the market.

And so I think it's to our benefit to be ready for those changes when they happen to be able to model them and kind of tune into them

earlier, you know, rather than later.

So with that, so there's a lot to talk about, I mean, I'm sure. Let's get together, you know, as this moves forward and figure out what additional, if any, scenarios or sort of pathways we can identify that might be a help, might be worth adding into the modeling. But you know, there is just so much urgency to get out there and ramp this marketplace up to decarbonize, so lots to talk about.

And even our Business-as-Usual, you know, quote unquote, "Business-as-Usual", is pretty darn aggressive, so in terms of, you know, we're really pushing the envelope with the instruments that we have, so -- but we need to do more. You know, there's just so much urgency and we need to bend that curve.

So -- but thanks so much for the -- for laying it all out. I mean, there's a lot to like in the scenarios and, you know, a lot of policies that I think we'll see. You know, it's a portfolio. And just like a stock portfolio or something, you know, some of them will succeed and really ramp quickly and other ones may not. So it's good to have this diverse, you know,

array of initiatives to help us get to, you know, the levels of, you know, efficiency and substitutions that we will need to get to our end goal in 2030, 2045, 2050.

So thanks, Ingrid. I appreciate that.

And I will cede to Commissioner Monahan if you have any questions.

COMMISSIONER MONAHAN: I do. Well, and it might be more of a discussion point with everybody because I think, you know, what I'm seeing is we're struggling with a new language around energy efficiency when it comes to including so-called beneficial electrification, like building electrification, transportation electrification, and we're trying to develop new terms and they're changing all the time; right? And so this additional achievable fuel substitution, additional achievable energy efficiency, they're both examples of kind of how we're trying to evolve the language.

And this builds off what you were saying, Commissioner McAllister, too about, well, should we be looking at greenhouse gas? Should we be looking at energy impacts broadly? Often we say energy when we mean electricity. And I would

encourage us all to be more like disciplined in that. I think some of the -- Heidi had showed some slides about energy but it was actual electricity. And because our Demand Forecast is so important for grid planning, I think we naturally sort of just default into energy being the same as electricity and it's not.

And so this question, like additional achievable fuel substitution, I think, oh, well, isn't that transportation electrification? Why wouldn't that be there? But right now it's just gas and it seems to be more on the buildings, industrial side.

So I still feel like we're -- we don't quite have the language right for what we're talking about. And I'd love Commissioner McAllister and Vice Chair Gunda, and Ingrid, your thoughts, maybe even Heidi, about that.

But just like this, you know, I would say, you know, transportation electrification is an efficiency strategy because electrification is so much more efficient than internal combustion when it comes to vehicles. And it's also a fuel substitution strategy but it's not counted here.

So there's sort of like -- can we

integrate? Can we figure out a language that will work for the entire system and then we can just stick to it? But it feels like we're not quite there yet.

COMMISSIONER MCALLISTER: Yeah, so that's a great point.

And I would just point out that, so, you know, we will hear about the Transportation Forecast in the afternoon, and that's an Energy Demand Forecast, and I think, you know, they're sort of different. So I totally agree with you, transportation and heat pumps, you know, which is a main -- one of the principal electrification strategies for decarbonization, both of those have the benefit, the duel benefit that they move to a less carbon-intensive technology and they are also highly energy efficient.

COMMISSIONER MONAHAN: Um-hmm.

COMMISSIONER MCALLISTER: But that doesn't always happen that way; right? So heat pumps are inherently more efficient than the alternatives, and electric transportation, inherently more efficient, and so that's great.

The difference, I think, is that you're taking liquid fuels, for the most part, and

you're translating them into electricity that then goes in the electric forecast, whereas with heat pumps you are actually taking natural gas, you're taking, you know, gas, fossil gas at the present moment, and moving it over to electricity.

So one focus, and I think Ingrid can probably speak to this, of the IEPR this year has been teasing out the -- you know, being more explicit, and Vice Chair Gunda has been leading a lot of this, as well, being more explicit about the linkages between gas and electricity, both at the generation level and at the end-use level, because they are really, you know, obviously, as you say, intertwined.

And so I do think we're -- I do think the work does actually make that link. And I think the, you know, the Demand Forecast increasingly is not just a siloed gas forecast and a siloed electric forecast but it actually has all these linkages built in. And so I think that's not always clear from the presentations because, sort of necessarily, we have to kind of talk about them in sequence, you know, in series.

But I think your point is extremely well

taken that, you know, we -- that all these dots are getting connected, you know, and we have to move with that reality --

COMMISSIONER GUNDA: Yeah. Just wanted to --

COMMISSIONER MCALLISTER: -- to make sure --

COMMISSIONER GUNDA: Yeah. Just wanted to comment, I think, Commissioner Monahan and Commissioner McAllister. There's a couple of high-level points I think, you know, just sticking to the spirit of the conversation which is, you know, having kind of a more systemwide idea and systemwide kind of consensus on the terminology, I think, is a really good suggestion at this intersection as we move towards the energy transition.

And you know, I think in a two-day workshop, even though it's like the electricity and the gas side, I think the more broader the energy demand, you know, I take the point from Commissioner Monahan on how do we think about this as a wholistic system and think through the cross-sectoral impacts on the different fuels, whether it's electricity, gas? You know, we do

have a gas-lean forecast that we do and that's -- you know, so how do we kind of combine all of them? I think it's a really good point.

And I just want to, you know, ask our team to kind of think through, you know, how do we do that? And then, you know, hopefully for the next IEPR, kind of put some suggestions on, you know, this broader technology that just is more compatible with the energy transition.

And the second kind of point I think Commissioner McAllister noted, and I really agree with that, and kind of maybe, Ingrid, you could weigh in? Again, I don't want to add any work for this forecast but, you know, the next forecast, as we think through.

You know, one of the things that we're observing, both on the demand side and the supply side, is, you know, there is an energy speak, and there's a carbon speak, and there's air quality speak; right? And I think no matter where we start from, I think we should be able to have metrics in all those arenas, and I know it's kind of hard to do that.

For example, a high electrification, you know, if additional achievable fuel substitution,

it would be great if the Demand Forecast and the different demand modifiers were to have some sort of a map, like Commissioner McAllister suggested, of what it would be in terms of carbon content; right? It's a quick cross walking between these different strategies and different agencies and the mandates we have.

And kind of being able to crosswalk and say, yeah, this scenario will not, you know, go all the way to 3232 levels but this is within the forecast domain where we're looking at the reasonableness, but maybe this is considered under the demand scenarios pathways where we have that. And I think having that ability to crosswalk the metrics, I think, is extremely, extremely helpful.

The same thing on the supply side. You know, when we talk about these strategies, you know, one of the things, you know, there has been suggestions over time to think about efficiency as a candidate resource on the supply side are the elements of efficiency. There has been suggestions on a variety of elements to be talked through as potential candidate resources in our resource planning.

And then that kind of goes to this other question of how do we value resources, right, on the supply side, you know, whether it's a dollar per, you know, kilowatt month, or whatever it is?

So again, there is a lot of different metrics we use on both demand and supply side that are not cross-walkable at this moment. And I think that that is something we could contribute to the state next year in terms of being able to come up with that framework.

But also, to Commissioner Monahan's point, you know, how do we then, you know, create a taxonomy that is cross-walkable, also, that provides a more, you know, more -- that really provides an opportunity for us to kind of talk through a system-level transition rather than any specific sector of fuel type?

COMMISSIONER MONAHAN: And I wonder, building off that, I mean, just a starting point of having overall energy use. And if we can distinguish that, the fossil portion of that, I think that would be sort of a movement towards this. Because -- and that will really highlight, right, electricity uses going up but, overall, energy use is going down in the 2030 time frame,

and here's what it means in terms of fossil energy use, as well.

I think those are really -- and those are -- I mean, it's derivatives of carbon but it's like kind of moving towards that more systemwide approach that gets away from this compartmentalization and focus on the electricity sector kind of implications versus the overall energy system implications.

COMMISSIONER GUNDA: Yeah. I love that idea, Commissioner Monahan. I think that's a great way of kind of thinking about the overall carbon content of the energy that we're using, you know, whether it's in a fossil electricity and where it's coming from and being able to do -- show a downward trajectory on the overall pathways, I think it would be great. Thank you for that suggestion. It's great.

COMMISSIONER MONAHAN: And I want to emphasize, this is really cutting edge work, Ingrid, that you and the team are doing. And it's -- you know, and this idea of how do we think about this in a more systemwide way is really going to be helpful for other states, as well, who are struggling with the same set of

issues.

And I think this would provide us an opportunity, maybe, to work more closely with CARB, you know, coming off of their Scoping Plan and thinking that through.

And again, Ingrid, before -- I want to be just very clear, we're going to the next year IEPR and I think we'll tackle some of these questions there. I definitely don't want to pressure any additional work at this point for this year but I think these are great conversations.

And just want to, you know, bring it back to you. You know, if not for the kind of work that you're doing, this conversation will not happen. And I'm just really glad that you're providing the information that elicits this kind of conversation and helps move the state forward. So, again, thank you so much for your work.

And Commissioner Monahan, Commissioner McAllister, thank you for those suggestions, as well. Incredible solutions.

COMMISSIONER MCALLISTER: Well, I want to just agree and amplify what Commissioner Monahan just said about the leadership of this. you

know, there was, over the last -- well, a few years ago and ending last year there was a work, sort of a collective work or projects, that NARUC and NASEO put on, organized, about comprehensive electricity system planning. And this was, you know, specifically the electric sector.

But you know, the PUC's 15 or so states worked together to come up with kind of some guided principles and some sort of suggestions for different states with different structures of their utility regulatory systems. And California was able to contribute so much to that conversation.

And you know, just people, I think, Public Utilities Commissions and, certainly, state Energy Offices across the country just don't have this level of expertise and resources on staff. You know, they're just not big enough to do that. And they typically, you know, kind of get the utilities to do this work.

And so we have the luxury, really, and the urgency to be able to work alongside and with the utilities, compare notes, you know, do our own independent analysis to kind of confirm or shift or, you know, really get the answer that we

think is the right answer and use that in our public policy going forward. I think it's just, it's an amazing opportunity that we have to lead here that we do and we can continue doing, and the other states really need us to do.

So the methodologies that you're developing here to do all this work are just, I think, you know, they're foundational to where we, as a country, need to go. So just, I think, that can't be understated -- or can't be overstated, rather. I think we tend to kind of be in our California world here but, you know, I think it really does have an impact beyond our borders.

So back to you, Ingrid.

MS. NEUMANN: I was taking notes, a lot of good ideas for future work; right? A lot of things we can improve upon. And it was interesting what, you know, Commissioner Monahan like picked up on this idea of like, well, where's the transportation electrification; right? So the Transportation Team is working on this and they might have some more to say about like having, you know, perhaps an additional load modifier in the future on that, or how the are

incorporating it now. I mean, it certainly is -- it is handled by them but it's just the additional achievable fuel substitution did sort of turn into just being building electrification, the way that we were building it up based on these programs that were all building focused.

So, of course, that is not the end all and be all of the system, as we know from our other work.

So, yeah, thank you for all that.

COMMISSIONER MONAHAN: And maybe, you know, I'm really sensitive to what Vice Chair Gunda was saying about no additional analysis was done, I agree.

But I wonder, I mean, maybe there's a way to change the language, just additional achievable fuel substitution in buildings; you know what I mean? And then it becomes, then you're like, okay, that's why transportation isn't there and that makes sense, you know? Otherwise, when you read it you think, well, that's not quite the right term.

So maybe there's something to be done around just tweaking the edges of the language.

MS. NEUMANN: Being very clear that we're

not including that portion in that --

COMMISSIONER MONAHAN: Yeah.

MS. NEUMANN: -- right? Yeah.

COMMISSIONER MONAHAN: The title should be really clear what's in and what's out.

MS. NEUMANN: Yeah.

COMMISSIONER GUNDA: Yeah. I think it's really like speaking to that moment of the integrated nature of our work. You know, for so long the transportation, I mean, we had like seven models. All seven could distinctly work on their own and then come together with the different answers. But I think it's just the crosscutting nature. I think it would really help, kind of clarifying those.

So maybe, Ingrid, that could be a one-day work that we could add to you in this IEPR cycle? But other than that, we'll keep it there in terms of just adding the specificity around the sectors, if we're able to, on these slides and such.

MS. NEUMANN: Yeah.

COMMISSIONER GUNDA: So --

MS. NEUMANN: So I think we should. You know, we were debating, do we do AAFS and include

transportation electrification initially, right, or do we call it AABE, and that just didn't flow as well. But maybe it needs to be AABE because that is what it is right now.

COMMISSIONER MONAHAN: Yeah. I would argue that it's better to have accuracies.

COMMISSIONER GUNDA: Yeah.

COMMISSIONER MONAHAN: It's better than -- more important than the acronym.

COMMISSIONER GUNDA: Yeah.

COMMISSIONER MONAHAN: Accuracy over acronym.

MS. NEUMANN: Like everything evolves, though, right, as we're doing the work?

COMMISSIONER MONAHAN: Right.

COMMISSIONER GUNDA: Yeah. Let's -- I mean, do not acronymize the building substitution, so I'll just leave it there, and I'll try to come up with --

MS. NEUMANN: Sure. That one, no good. No good.

COMMISSIONER GUNDA: Yeah. But, well, with that, I think -- I don't know how we're doing on time. I think now maybe pivoting to Heidi real quick and see if there's any Q&A come

in?

MS. JAVANBAKHT: There are no questions in the chat.

COMMISSIONER GUNDA: Great. Thank you so much, Heidi. And I think I don't have any more questions.

Commissioner Monahan or Commissioner McAllister, any other final thoughts before we hand it back to Heidi -- back to Heather?

COMMISSIONER MCALLISTER: Well, yeah, so public comments. I don't -- I wouldn't -- I don't think I have any closing comments but I think we need to make room for public comments --

COMMISSIONER GUNDA: Yeah.

COMMISSIONER MCALLISTER: -- if there are any.

COMMISSIONER MONAHAN: I don't. I don't either but I just wanted to thank you guys for a fun conversation.

COMMISSIONER MCALLISTER: Yeah. Yeah, this was great. Thanks. Thanks a lot, Commissioner Monahan, Vice Chair Gunda.

COMMISSIONER GUNDA: So with that --

MS. RAITT: Okay. Great. So we'll move on to public comments. And Dorothy Murimi from

the Public Advisors Office is here to help us with that.

So go ahead, Dorothy.

MS. MURIMI: Thank you, Heather.

Just a few instructions for everyone.

One person per organization may comment. And comments will be limited to three minutes -- to, pardon me, to three minutes per speaker. And if there are several parties interested in commenting, we may need to reduce the time to one-and-a-half minutes per speaker.

Now once I call your name, go ahead and list your name and your organization or affiliation. If you're on the Zoom platform, use the raise-hand feature, and that looks like a high-five, it's at the bottom of your screen or device. And if you're solely on the phone, go ahead and press star nine to indicate that you'd like to make a comment, and star six to un-mute on your end, and we'll un-mute your line.

I'll go ahead. I'm going to go ahead and check for hands here and give that one moment. Again, that is raise-hand feature if you are on Zoom. And if you're solely on the phone lines, go ahead and press star nine.

Seeing no hands, I'll hand the mike back to you, Heather.

MS. RAITT: And I'll hand it back to the Commissioners.

COMMISSIONER GUNDA: Thank you so much, Heather, again, really great morning session. Really appreciated both Heidi setting the stage and Ingrid just kind of going through the AAEE and the fuel substitution. I'll look forward to hearing public comments in the record, so that we can continue to move the forecast products forward.

With that, Heather, I'm guessing, you know, I don't have any final comments other than that.

I don't know if fellow Commissioners want to add anything else? I don't see any.

Okay, Heather, I'll pass it back to you for setting up the second session.

MS. RAITT: Yes. So I just hope everybody can come back at the two o'clock session, the Transportation Forecast and Demand Scenarios Project. And just a reminder that there is a new link for that afternoon session, so we'll be back then.

COMMISSIONER GUNDA: Thank you.

(Off the record at the 11:59 a.m.)

CERTIFICATE OF REPORTER

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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IN WITNESS WHEREOF, I have hereunto set my hand this 22nd day of January, 2022.

MARTHA L. NELSON, CERT**367

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I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were transcribed by me, a certified transcriber and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

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I certify that the foregoing is a correct transcript, to the best of my ability, from the electronic sound recording of the proceedings in the above-entitled matter.

January 18, 2022

MARTHA L. NELSON, CERT**367