DOCKETED	
Docket Number:	19-IEPR-01
Project Title:	General/Scope
TN #:	227259
Document Title:	Transcript of 01172019 Joint Agency Workshop
Description:	N/A
Filer:	Cody Goldthrite
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	3/4/2019 2:44:57 PM
Docketed Date:	3/4/2019

CALIFORNIA ENERGY COMMISSION

In the Matter of:

Southern California)
)
Natural Gas Prices)
____________________________)

JOINT AGENCY WORKSHOP

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET

FIRST FLOOR, ART ROSENFELD HEARING ROOM

SACRAMENTO, CALIFORNIA

THURSDAY, JANUARY 17, 2019

10:00 A.M.

Reported by:

Susan Palmer

APPEARANCES

COMMISSIONERS

Robert B. Weisenmiller, Chair California Energy Commission, Lead Commissioner for Electricity and Natural Gas

Janea Scott, Lead Commissioner for 2019 IEPR and Transportation, California Energy Commission

J. Andrew McAllister, Lead Commissioner for Energy Efficiency, California Energy Commission

David Hochschild, Lead Commissioner for Renewables, California Energy Commission.

ENERGY COMMISSION STAFF

Heather Raitt, IEPR Program Manager

Chris Kavalec, California Energy Commission staff

Cary Garcia, California Energy Commission staff

MODERATORS

Jeffrey Michael, University of the Pacific

Louise Bedsworth, Strategic Growth Council

PANELISTS

Jerry Nickelsburg, UCLA Anderson Forecast

Irena Asmundson, California Department of Finance

Rachel Cortes, San Diego Association of Governments

Cynthia Kroll, Association of Bay Area Governments

Adam Kamins, Moody’s Analytics (via WebEx)

Bob Raymer, California Building Industry Association

Tiffany Roberts, Western States Petroleum Association

Michael Shaw, California Manufacturers and Technology Association

APPEARANCES

PANELISTS

Jeff Bellisario, Bay Area Council (via WebEx)

John Cho, Southern California Association of Governments

Tracy Egoscue, Port of Long Beach Commission

Cyndee Fang, San Diego Gas & Electric Company

Eduardo Martinez, Southern California Edison Company

Tim McRae, Silicon Valley Leadership Group

Karen Mills, California Farm Bureau

ALSO PRESENT

Andrea Bailey, California Energy Commission

Jesten Ruiz, California Energy Commission

Jasey Crosby, BBSW

Cameron Luther, REMI

Andrew Kosydar, CBIA

Tim Carmichael, Sempra Energy

Ken Schiermeyer, San Diego Gas and Electric

AGENDA

P R O C E E D I N G S

10:03 A.M.

SACRAMENTO, CALIFORNIA

THURSDAY, JANUARY 17, 2019

MS. RAITT: All right, good morning. I think we're just about ready to go here. Welcome to today's 2019 IEPR Lead Commissioner Workshop on California's Economic and Demographic Outlook. This is our first workshop for the 2019 IEPR.

I'm Heather Raitt. I'm the Program Manager. I'll quickly go over our usual housekeeping items.

Restrooms are out the -- across the hall there. If we have an emergency and need to exit the room, please follow staff out through the doors and across the street to Roosevelt Park.

Our meeting today is being broadcast on our WebEx conferencing system, so it's being recorded, and we'll have a written transcript posted in about a month. And we'll also have an audio recording posted on our website.

There will be an opportunity for questions at the end of each panel, so we'll take -- if you have questions, we'll take them first from folks in the room, and then from folks on WebEx.

There will also be an opportunity at the end of the day for public comment and those will be three minutes, limited to three minutes. If you do want to make public comments at the end of the day, please fill out a blue card. They're at the entrance. You can give it to me.

For folks on WebEx, you can use your raise-your-hand feature that WebEx provides to let our coordinator know that you wanted to make a comment.

And then at the very end, we'll open up the lines for the phone-in participants.

Materials for the meeting are at the entrance to this hearing room, and also posted on our website. The notice provides instructions for submitting written comments and they're due on January 31st.

And then just finally for our panelists, I'd just like to thank you for being here. And just remind you, we do have folks on WebEx, so if you could try to remember to identify yourself each time before you speak, that would be really helpful.

And with that, I will turn it over to

Commissioners for opening remarks. Thank you.

CHAIR WEISENMILLER: Yeah. So this is Chair Weisenmiller. Just a few comments.

I mean, first, for context, this is actually part of the 2019 IEPR, if anyone is confused. The 2018 IEPR will be up for adoption soon. Commissioner Hochschild has been the lead on that. The 2019 IEPR, which is the kickoff one, Commissioner Scott will be the lead on that one. So again, we haven't quite gotten one out the door and we're starting on the next.

But you know, the economy is very important to us in California. Certainly, trying to understand the drivers there is one of the things that really can influence our forecast. And as we go through the forecast, this is one of the first steps, is to try to look at the economic and demographic outlook coming forward, so I certainly appreciate you being here.

Our forecast drives a lot of the state planning in the power sector, both at the CAISO and the PUC. So again, it's really important that you help us get this right. And at the same time, it's important for us to, as I said, to understand the economy so that we can try to figure out ways to, again, keep driving that engine of California's greatness.

COMMISSIONER SCOTT: Well, good morning everyone. This is the 2019 IEPR, overlapping a little bit with our 2018 IEPR. This is Commissioner Janea Scott. I am delighted to be the Lead on the 2019 IEPR. And I want to thank everyone for being here with us today.

As Chair Weisenmiller mentioned, the demand forecast is one of the core responsibilities here at the Energy Commission and it serves as an anchor to our IEPR process. The forecast is used in a number of different planning efforts, and so it's important for us to make it as robust as possible.

Our staff have done a really great job of continuing to develop and refine the forecast over the years, keeping pace with emerging trends and changing market forces. But as you all know, California's quickly evolving energy economy creates new challenges when developing a forecast and makes it more important for all of us to be leveraging the information that's available. So workshops, like the one we're having today, help provide an opportunity for us to get insight from regional leaders with on-the-ground knowledge, industry experts, business representatives, and other stakeholders on how they see California's economics, demographics and business climate changing over time, all of which are critical components to the development of the forecast.

And so with that, I'm glad to be here. I look forward to today's discussion.

COMMISSIONER MCALLISTER: Yeah. Not too much to add. I guess just -- sorry, this is Commissioner Andrew McAllister. I'm taking -- well, this year, I'm happy to work with Commissioner Scott on the IEPR, and particularly focusing on the forecast and some of the long-term challenges we face in updating the technology related to the forecast or by which the forecast is done, taking advantage of all the modern amenities of lots of data and, you know, the wide range of stakeholders to address, really, the foundational needs of the challenges we face going forward for the next, you know, 20, 30 years.

So the forecast is the foundation, as Janea just said. And we need to kind of rise to that challenge because things are getting more disaggregated, they're getting more complex, localized, lots of different questions that we're going to need to ask and we have to have the tools to answer. So not that the forecast is going to be the solution to all of those questions but I think it's a foundational tool that helps us organize our thoughts and dig in, in specific areas where we need to.

So the economic demo is really critical. And I think if we look at -- as we try to understand where the economy is and where it's headed, particularly in the near term, there's a lot of question about, you know, when the next recession is coming, when -- you know, what the near immediate term actual looks like?

So hopefully our discussion can shed some light on how we talk about that and give us the latest information about how we can anticipate all different scenarios. And so I'm looking forward to today and future IEPR workshops.

COMMISSIONER HOCHSCHILD: Well, welcome, friends, and good morning. David Hochschild here. My thanks to Heather and the whole IEPR Team. It's a little bit like painting the Golden Gate Bridge; as soon as you finish one IEPR, you start over again.

So obviously, our economy in California has been significantly outperforming the U.S. economy. GDP in California has grown 46 percent since 2000, versus 35 percent growth for the other 49 states. And you know, whether this will continue and what happens to the national economy is an open question.

So thanks to you all for being here and I look forward to getting into these issues today.

MS. RAITT: Great. Thanks. So this is Heather Raitt again. And first we'll have a presentation from Cary Garcia on the California Economy and Energy.

MR. GARCIA: All right. Thank you and good morning. I like the Golden Gate Bridge analogy. I think that suits very well. I'm looking at the forecast schedule for next year already today.

So I'm Cary Garcia. I'll be coordinating the demand forecast for this year's IEPR.

And so the first thing, I think the Commissioners really touched on it, economic activity is really a key driver for our demand forecast. Looking at just some quick graphics of electricity consumption and just to give some background, so the way we develop our forecast, we try to model on the way the consumer is behaving. So rather than looking at just energy sales, we go back, take the self-generation, typically from PV and other sources, and reconstitute what consumption would be and use that to develop our projections, and then take off all the developed sales based on the PV and add the other modifiers, like electric vehicles and whatnot.

So just looking at this graph here of consumption that we use, you can see it tracks pretty well with per capita income. It's obviously a key driver there, particularly in the residential sector.

Once again, looking at employment, you see a very clear trend with electricity consumption, as well. So that, once again, is just a really important key driver for us, just rehashing that the economy is very key to a robust forecast, as the Commissioners mentioned.

And so just kind of repeating what I said, reiterating this, you know, it's a key driver for energy consumption. And then as the

Commissioners mentioned, you know, getting a good sense of where those demographic shifts are going to be really important, and particularly those regional differences because we have a pretty disaggregated forecast we have developed over time and we may go down even deeper, depending on the needs in the future.

And I also want to mention that these economic conditions also affect our other parts of our forecast, particularly forecasting fuel demand which has impacts on the adoption of electric vehicles. And then now, as we're moving towards a decarbonized future, this tradeoff between natural gas and electricity demand is going to be more important to understand, as well. And I imagine the economy is going to be a driver there in those tradeoffs.

So just to give some -- a little background as we have this conversation, this is a map of the forecasting zones that we have in our demand forecast, so we've organized these by planning areas which are typically developed around our utility planning areas.

So items one through -- or Zones 1 through 6 represent the PG&E planning area; 7

through 11 will be the Southern California Edison planning area; San Diego has their own -- San Diego Gas and Electric has their own as Forecast Zone 12; and then 13, 14, 15 represent the Balancing Authority of Northern California which includes SMUD, as well as the components that aren't in there in that Balancing Authority, which would be the Turlock -- or, sorry, Trinity Public Utility District and other entities; 16 and 17 is L.A., disaggregated by an inland and a coastal region; and then we have Burbank, Glendale, Imperial Valley, Imperial Irrigation, as well as Valley Electric Association over there on the border of Nevada.

So this gives you a sense of the disaggregation that we're working with right now. Most of our economic data is based around county information and we kind of aggregate that out to represent our planning areas, as well as our forecasting zones.

And these are just some graphs I put together real quickly. I think many of us are Californians, but maybe for the ones that don't, we have a pretty diverse state, and you can see some distinctions here across our counties. You can notice here in the Central Valley region in particular, you see high rates of unemployment in comparison the coastal regions. You even see higher unemployment in those more northern regions that we have, more northern counties.

One thing I wanted to point out here is that you see my scale of two percent to eight percent. When I was just developing this graph, actually, Imperial County has significantly high unemployment, around 18 to 19 percent, and so I was struggling with that when I was developing this graph; everything looked just a flat blue. I was like, that can't be right, there has to be some distinction, so I made some adjustments there. But just a mental note for me and a note for all of you here that the eight percent doesn't represent Imperial County.

Once again, looking at some of the other geographic distinctions that we have, this is population growth in the state. So you'll see in those northern regions, in the Sierra Nevada regions, there's definitely a decline in population relative to the inland areas. And then looking at household growth you also see that there's a similar sort of trend going on there.

But one thing I wanted to point out, as well, is you're looking at unemployment here, it seems to be high in the Central Valley and those inland regions, but yet those are the places where you're seeing population grow, as well as the household growth. So that's something to think about as we have some of these conversations today.

But I want to leave it at that. I just wanted to be very brief and just reiterate the importance of having, you know, good data.

And from the panels today, I would hope that you can kind of put is in the right direction on some areas we may need to take an additional review of what may be some new drivers that we should look at and what are some additional ideas you may have, particularly around understanding energy consumption in the state?

And then lastly, I also want to thank Nancy Tran. She was the lead for our Demand Analysis Office to bring this together. So I don't -- is she here? She's in the -- hiding in the back, so I just want to recognize Nancy Tran for the work she did to organize this.

So I'll leave it at that and let the other panelists take over.

MS. RAITT: Thanks, Cary.

So this is Heather Raitt again. And our first panel is on the California Economy Now and in the Future. And the Moderator is Jeffrey Michael from the University of the Pacific.

MR. MICHAEL: Great. Thank you. It's terrific to be here again. I was here two years ago, moderating this panel. I'm Jeffrey Michael, Executive Director of the Center for Business and Policy Research at the University of the Pacific, Professor of Public Policy here at our McGeorge School of Law in Sacramento.

I'm going to briefly introduce each of our panelists, and then we'll just jump right into the discussion.

So to my right is Irena Asmundson. She is the Chief Economist for the Department of Finance. I think your eighth -- or, sorry, fifth year in that role, so she's been in that role for five years, a lot of policy experience, Senior Economist with the IMF, worked with the President's Council of Economic Advisors in the past. She has a PhD from Stanford, so we're really pleased to have her here.

Rachel Cortes from the San Diego Association of Governments. She is one of their top tomographers there. So Dr. Cortes is an expert in demography and statistical methods, worked for the U.S. Census Bureau before coming to the San Diego Association of Governments.

Next to Rachel is Cynthia Kroll, who is Chief Economist at the Association of Bay Area Governments, and the MTC, Metropolitan Transportation Commission. So I've had a lot of great conversations with Cynthia over the years. She has her PhD in City and Regional Planning and has been just a prominent economist and expert in California and around the Bay Area for many, many years.

To her right is Jerry Nickelsburg with the UCLA Anderson Forecast. Jerry has been leading the California forecast for over a decade, is a really well-known figure in forecasting throughout the state. And it's always great to see Jerry. So, welcome, Jerry.

And then I believe on WebEx, we have, just from Moody's Analytics, Adam. Are you there? He's logging in? Okay.

So Laura Ratz was going to join us from Moody's. Laura is, unfortunately, ill today, but we're fortunate to have Adam Kamins or Commons [sic] substituting this morning, pinch hitting for Moody's where he's a Director, and he manages the firm's U.S. subnational forecasting processes.

And, Adam, are you logged in now? No?

I think we started a little bit ahead of schedule, so Adam will join us in a moment, so I'm just going to start off.

And, Adam, please let us know when you join, so I can pull you into the conversation.

Two years ago I moderated this conversation and, you know, we were on the brink of a presidential inauguration in January 2017. People were wondering, you know, about the forecast? And you know, the consensus forecast from our panel at that time, although I do recall one person was very pessimistic in predicting a recession, but sort of the consensus outlook was actually very positive for the near term. The fundamentals of the economy looked good, looked pretty good, and that there was expectation that the Trump administration was going to pour some stimulus on to the economy in the near term, tax cuts and deficit spending. And so anxiety, a lot of people seemed to have anxiety, you know, in the two- to four-year time range or concern about what we could be looking at then.

So thinking back to that panel and now recognizing that we're sitting two years from that date, it is now that two year -- I'd point out, I think the first part of that forecast looked pretty good. And so what do you see now?

So I'm going to ask a few of our panelists to give a short synopsis, maybe about three minutes, of their current sort of macro, in California, forecast. And I think I was going to start with Adam, but I think he's still logging in.

So maybe, Jerry, if you want to lead with that?

MR. NICKELSBURG: So, let me, first off, thank you for the -- ah, it's green. Thank you for the invitation to be here once again.

Just one note. I have students at UCLA who are waiting for me late this afternoon, so I'm going to leave a little bit early, not too much, but if I leave it's not because I'm bored, it's because my students would like me to be there in class.

So let me start with where we're at. The fundamentals that gave us a two percent growth rate in the U.S. economy in this expansion have not gone away. The change in the tax law didn't change that. So we had a stimulus that was put on top of what was, certainly here in California, a full employment or close to full employment economy, and in many other parts of the country where they saw significant economic growth, that kind of pushed the economy into sub-four percent unemployment. If you look at the Bay Area going from Sonoma all the way to Santa Clara, you have sub-three percent unemployment, and so that's something that is not sustainable. We're expecting to move back to a two percent economy.

But in that regard, one thing that the new tax law did was it brought investment that was going to occur this year and going to occur in 2020 back into 2018 because there were significant tax incentives to do that. And that means that that investment won't be there this year and next year. And our view is that that's more impactful for 2020 than 2019, so we have a growth rate of the U.S. economy that's one percent in 2020 and the latter half of 2020 is less than one percent. That could happen sooner but that's our best view of that.

And just briefly, with regard to California, it has been, as the Commissioner pointed out, growing faster than the rest of the U.S. We expect that to continue. Again, the forces that have created that are still there.

MR. MICHAEL: Thanks Jerry. I think there's a lot there that we can probe in more depth in a few moments.

But I think now I'm going to ask Irena to summarize the Department of Finance forecast.

MS. ASMUNDSON: Thank you. So in the Department of Finance forecast, we have to assume that we don't have a recession in our forecast. And so I do want to warn everyone that that's why we do the recession scenario because it's probably inevitable, it's going to happen at some point, we just can't know when.

So I did want to mention a couple of things about our forecast that I do want you to pay attention to that I think, probably, are going to make a difference in how you think about demand forecasting in the future. And to me, everything comes back to housing.

So we do have employment growth. We do have employment growth. We do have continued income growth. We have not -- we do have continued population growth, although population growth is slowing and it appears that it is slowing a little bit faster than what we'd assumed. In the '80s, we had about a one percent population growth every year. We think that that might slow. It slowed to about .7 percent. Last year was about .5 percent. That could, in fact, be what we see in the future.

And a lot of this ties back to the housing forecast. (Bumps microphone.) Sorry. A lot of this ties back to the housing forecast in that we are not building enough housing for our population and we are not building enough housing where the jobs are, which implies quite a lot more commuting than what we would otherwise see.

And so if we are trying to figure out how to bend this curve and go to a zero-net-carbon economy by 2050 or something like that, then there are quite a lot of changes that are going to have to happen in the economy and in the planning for California.

So kind of a word of caution in that, yes, we have these trend analyses where our trends continue, but in our planning, we are increasingly thinking about how much higher things could be or how much lower things could be on various things.

MR. MICHAEL: So do you expect a higher level of uncertainty then, if you're increasingly thinking about --

MS. ASMUNDSON: Yes, usually more uncertainty. And I think that it's worth trying to put together scenarios about what kinds -- how uncertainty could all fit together. So it's not that for any indicator you have a rate of error, it's that things could go in vastly different directions and the policies have to fit together in a particular way. So I think it's worth thinking about that.

MR. MICHAEL: So, Adam, are you on the line now? He is? No? All right. I got a message that he was there but we can't hear him.

MS. RAITT: We can't hear him, so maybe we should move on.

MR. MICHAEL: Well, we'll come back. I want to pull him into this macro discussion.

But I think I might, at this point, just ask for a little reaction to what we've heard so far.

Cynthia or Rachel, is there -- as you think about sort of this California macro perspective, any observations?

DR. KROLL: It sounds like the California I'm seeing, both the strength relative to the country but the challenges in terms of things like housing.

DR. CORTES: Yeah, just kind going off of what Irena was saying about building kind of scenarios around these different economic outcomes, SanDAG, also, in our forecasts, we don't forecast recessions, but I think everyone's kind of waiting for it.

And kind of tying back to the big data kind of discussion, I feel like today we have the capability and capacity to run multiple scenarios of growth and maybe decline that, I don't think, at least at SanDAG, we were kind of able to do it in the past. But it's something that we're looking at, kind of how would these things change and how can we take that forecast?

And the real tool is the next kind of transportation-based modeling that we have to do around it. And in the past, I don't think we could have done all of that in one planning cycle. And now we kind of have that capability to look at those things and see how they're going to affect San Diego in the future.

MR. MICHAEL: I want to come back to this question of recession risk. And, hopefully, Adam will be on the line in a moment.

And maybe ask, Jerry, I think you said in 2020, your baseline forecast is for a less than one percent growth rate. It's getting awfully close to recession.

I did an event about two weeks ago with Scott Anderson, Chief Economist with Bank of the West. His 2020 recession forecast was a little bit over 50 percent two weeks ago.

You know, are you able to speak in probabilities of what you think to be happening?

MR. NICKELSBURG: Sure. So we've all said a few things about recession.

MR. MICHAEL: Um-hmm.

MR. NICKELSBURG: And so let me try and

frame that.

You know, recessions are about imbalances in the economy. And what recessions do is correct those imbalances by moving labor and capital out of sectors that are weak and in decline and into sectors that require them, or breathing room if, for example, we have too much housing, which we don't have now, for the population to catch up.

But what you need for a recession is something to trigger it, and so then you have several sectors that are weak and the trigger will cause them to simultaneously contract. That's what a recession is.

When you look out two years in advance, you know, trying to forecast a recession is really something that the data don't admit because you can't forecast these triggers that far in advance. You can only indicate that there's weakness that a trigger would create that. And what kinds of triggers are we seeing now, the kinds of things that we should be looking at?

Well, one is disruption in trade flows. You know, were that to occur, we have too much, too many resources in trade and distribution and not enough in manufacturing, and that would be one additional weak sector which might drive us into a recession. The current government shutdown, if it goes on for long enough, that could be a trigger that changes expectations. So there are a number of things that could really trigger this. The bond market is a place where you find weakness today, as well, where imbalance is, and potential weaknesses.

So I hesitate to give a probability of a recession because of the real difficulty of forecasting it. But the point I want to make is look at what might trigger one, because we're seeing the imbalances building up and 2019 and 2020 being times when the growth rate in our economy is, you know, close enough to zero where a trigger could actually create it.

MR. MICHAEL: Okay. So I'd love to get Adam's perspective here. We're still working on him, getting him on the line. Hopefully he'll be here shortly.

But you know, we talk about triggers and it, I mean, it seems like almost every morning, you wake up and you see the news and something happens and you wonder, is this the trigger, whether that's globally or nationally? So you know, discussions of trade flows in international might be part of the trigger.

So the news this week was, you know, collapse of the Brexit deal, something that adds some instability into the global economy. Does anyone have some thoughts on how that might affect the outlook?

Irena?

MS. ASMUNDSON: So in our recession scenario, we actually modeled a Fiscal Year 2019-20 indicative scenario. I'm not saying that it's going to happen but that's sort of how we modeled it. And this year, the way we modeled the trigger was that the stock market had been doing really well up until about October, and a lot of that was what a lot of economists are calling the sugar high of tax cuts and a lot of money flowing back to very wealthy individuals. At the same time, interest rates were rising. Companies had taken on quite a lot of debt because it was very cheap to do so. And so one of the triggers we thought through was that what would happen if businesses and companies all of a sudden realized, oh, consumers are not doing so well?

One of the things that we talk about is that from -- in 2017 -- 2007, the median household income in California was around $71,000. In 2017, the median household income for California was around $72,000 in inflation adjusted numbers. They have barely done better over ten years. The economy itself has done much better.

And so a lot of people who look at aggregates and look at these demand factors and think that we should be doing so much better and that companies should have so much more demand and can take on debt to service all these customers, there's a fundamental irrationality there. And when they realize that consumers aren't actually doing very well because they haven't been given them wage increases for the last ten years, that reckoning could be a trigger.

MR. MICHAEL: Consumers is something we haven't talked about too much to this point.

Adam, it sounds like you're on the line, but let's --

MR. KAMINS: Yes. I apologize. Yeah,

technology is great until it isn't, but I'm here now.

MR. MICHAEL: Adam, if you could -- so I'm going to roll back just for a second and if you could sort of give us a synopsis of the Moody's forecast? And I don't know if you've been listening to our discussion but we've been talking about sort of recession probabilities and what's the chance of that and where that might come next, so --

MR. KAMINS: Sure. Yeah. No, I'm happy to talk about that, and I did hear some of the discussion.

So the economy at the moment, obviously, things are looking very strong. Risks are gathering but, you know, at the moment we don't see any immediate risks that make us think that a recession is in store in 2019. You know, the economy is clicking on all cylinders for the most part. You know, the unemployment rate is kind of beyond full employment at this point.

Kind of the bigger dynamics that we're concerned about at this stage in the cycle would be kind of the fact that your inflationary pressures should be starting to build. We're seeing some evidence where, you know, wage growth is picking up, for example, in a way that it hadn't been for much of this cycle.

You know, that has compelled, I think, in many ways the fed to begin to raise rates a little bit more aggressively. But we saw, you know, obviously, what the consequences of that were back in December. And so our expectation now is that they're going to take their foot off the gas a little bit. And you know, the stock market, in all likelihood, will probably stabilize over the course of the next year. We don't expect kind of a continued downward trajectory.

So over the next year, I think we're in reasonably good shape. But there are, obviously, some major risks, but I'm sure we'll talk about that as the sessions goes on, both, you know, the trade war, the government shutdown, for example, or you know, big kind of policy missteps that so far have not taken down the economy in any meaningful way. But you know, if we go kind of in the continued wrong direction on policies along those lines, that could have a real impact in 2019.

So there are risks that I think are becoming more pronounced. But our baseline expectation is that, you know, as the stimulus that first was associated with the tax cut last year and that should come out of the fact that there's increased federal spending this year, that's kind of an asterisk there that, you know, that increased federal spending is more than offset if the government actually isn't functioning, but if, you know, if kind of the government reopened and you get kind of another fiscal stimulus this year, I think that's enough to keep things moving in the right direction on 2019.

But I think by the time you get to 2020 and, you know, our eyes have been for a while on sort of mid-2020 as being kind of the most likely spot where, you know, some of that stimulus begins to wear off, bubbles begin to, you know, emerge in the economy and then begin to rupture a little bit, and I think that is sort of the most likely point where you're going to see a little bit of a reckoning.

So that's, yeah, I think low probability in 2019 of recession but a fairly high probability of one in 2020, 2021.

MR. MICHAEL: Brave enough to put a number on that?

MR. KAMINS: Wow.

MR. MICHAEL: I'll let you off the hook on that.

MR. KAMINS: I mean, I would say --

MR. MICHAEL: Go ahead.

MR. KAMINS: Yeah, I can be brave enough to put a number but I'm chicken enough to use 50 percent; how about that?

MR. MICHAEL: All right. There we go. That's one I've been hearing a lot lately, which is certainly much higher than sort of that baseline recession risk.

In a moment, my next question, I'm going to ask a little bit about the government shutdown, because I'm interested in what that could lead to.

But I actually want to follow-up on Irena's comment about consumers. We're talking a lot about investment in the international economy but consumers are about 70 percent of GDP. Irena raised some concerns about consumers. And so I'd like to ask you just a moment about your outlook for consumption in household spending.

MR. KAMINS: Yeah. I mean, in the short run it still looks pretty healthy. Consumer confidence is very high. We had a good holiday season in 2018. And I think a lot of that will continue as long as the unemployment rate remains as low as it is and we start to see more money coming into people's paychecks which, again, we are sort of incrementally starting to see now, according to some measures that we look at.

So short run, I think it's healthy. But I think a lot of the risks that we talk about with, you know, some of the stimulus wearing off and, certainly, again, some of the risks that, you know, that I mentioned and that you kind of referenced, whether it's, again, the trade war and government shutdown are two kind of big examples of where you're going to see, potentially, an impact on consumer confidence, an impact on spending. And so as we sort of, you know, see these risks less offset by some of the stimulus in the economy, I think by the time you get to next year that there is going to be a little bit more concern there.

MR. MICHAEL: You know, over a decade

ago, leading into the last recession, one of the imbalances or triggers, it could be argued, that high levels of debt for consumers in households that weren't sustainable and it ended up creating problems --

MR. KAMINS: Right.

MR. MICHAEL: -- for the economy. We've had sluggish wage growth but how are household -- what's the outlook for household debts?

MR. KAMINS: I mean, household balance sheets look pretty solid. I think -- I don't think household debt is going to be a major issue leading into the end of this cycle.

I think the bigger concern on our end is actually corporate debt, that there's a lot of leverage lending happening. And because interest rates have been so low for so long, you've had a lot of debt accumulating in the corporate sector. And I think that that is a real concern. And I mean, that eventually could make its way into, you know, weakening wage growth, for example, if, you know, if that gets firms into trouble, for example.

So I think that would be a channel that I'd be more concerned about. I don't think consumer balance sheets are a major problem, speaking from kind of a macro perspective.

MR. MICHAEL: Okay. Do you want to jump in that before we move --

MS. ASMUNDSON: I just was going to say, and I'd like to hear Rachel's thoughts on this, as well, you know, we're kind of at a different place right now in terms of the demographic cycle in that a lot of the baby boomers are either retired or about to retire. And so the composition of that, even though the aggregate amount might not look terrible, in California there's fewer people who are homeowners so there's less mortgage debt, but the levels of student debt, which is not able to be gotten rid of in bankruptcy, that's also much higher.

And so the two factors that might constrain people from adjusting in the next recession are younger people who have lots of student debt and can't get rid of it and older people who can't work for longer.

MR. MICHAEL: That's interesting. I mean, the aggregate level household debt is a bit lower but the composition has changed.

Rachel, do you have a comment?

DR. CORTES: I'm a demographer, so just so everybody knows.

MR. MICHAEL: Yeah.

DR. CORTES: I don't know a lot about this stuff. But I did, when you were talking about that, I did kind of think about student debt as, you know, someone with a little of my own. And I'm also thinking about the growing baby boomer population in San Diego County.

And something that I keep thinking of is maybe another scenario is, you know, we kind of assume that generations will kind of want to act the way they want to act today, but if they don't act the way they act today and they move out of San Diego because their house is worth, you know, five times what they paid for it and they decide to move somewhere else, and maybe they move outside of the country even?

So I think San Diego County, I mean, most of the population growth we're projecting is in the age of 65-plus, and we're just not seeing fertility rates kind of keeping up with that. So there's a lot of universities there. Those people come in maybe with debt and then they take it with them when they can't find a high-paying job in the county.

So I think, I mean, I personally would be concerned about student debt especially, how it pertains to home ownership.

COMMISSIONER MCALLISTER: Can I ask a quick question, just about the demographic changes?

So population growth is kind of slacking off, not what it used to be. Could you sort of break down the composition of that population growth or sort of what the sort of inflows and outflows and where they're coming from?

DR. CORTES: I mean, Irena can do that for the state. I can do it for San Diego County.

I think most of our population growth is still due to natural increase because San Diego still has kind of a net-zero intention. We in-migrate a lot of people from foreign countries but we out-migrate a lot of people of kind of those working age groups to different, probably, adjacent counties, but also to other counties within the United States.

We've been a majority-minority county for a while now and that will kind of continue to grow, I think, into the next -- obviously, continue to grow. And yeah, the -- I mean, in terms of like education, you know, education is increasing for all age groups, but are they going to stay and work in San Diego, is really what we're not sure about.

Maybe Irena can speak more to that.

MR. MICHAEL: I think I actually kind of have a list of demographic questions that we'll probably get to in about 15 minutes, and then we can go into a lot more depth in this. But I do want to sort of put a little bit of a wrap on the discussion.

I think, Jerry, I sort of had a comment. I also wanted to just ask, also, about the partial government shutdown. You know, we're several weeks into that with no end in sight. So any thoughts on how that could affect the outlook?

MR. NICKELSBURG: The -- I actually have two comments now.

MR. MICHAEL: Yeah.

MR. NICKELSBURG: So the first has to do with recession probabilities. And you're hearing a lot of, you know, 50-50, flip a coin. If you actually look at statistical models on recession probabilities, they show very low probability until you're right on it. So there's not much forward looking information, statistical information, when it comes to recession probabilities.

The same is true with triggers. If you look at what triggered the past four recessions, we were past it before we knew that trigger had happened. So you have to kind of think about the things that are going to drive a recession and try to recognize them before we statistically recognize them.

So that was one comment about, you know, why are people flipping a coin and saying 50-50? It's because statistical models don't really tell us.

With respect to the energy forecast, and something that really is changing, and this addresses the discussion about housing and demographics, one of the things that we're seeing, more in the Bay Area than elsewhere, is an increase in job growth in excess of population growth and an economy with less than two-and-a-half percent unemployment. So how does that happen? Partially, it's bringing retired people back into the workforce, but partially, it's retired people moving out and younger working-age people moving in and taking their houses.

So the relationship, the historical relationship between employment growth and energy demand, you know, is changing. It's not that employment growth is generating new homes and additional energy demand. It may just be, at least in some sense, a swap, so one should be thinking about that in the forecast.

Now you want to start on the government shutdown. So the big question is how long?

Right now, if the shutdown ended before this conference, probably not much of an impact because wage is paid retroactively and there's some impact but maybe not huge. If it goes on for, you know, for quite a while, if it goes on into say mid-February, I think that really elevates the risk of consumer confidence dropping dramatically. And consumption, as we've all talked about, you know, correctly, has been the driver of the latter part of this recovery or this expansion, that turns around.

MR. MICHAEL: I think let's start to move into a bit of the regional discussion. And I'm going to ask Rachel to come back in again.

I know you jumpstarted it a little bit, but if you want to add some additional discussion, I'd like to talk a little bit about the regional economy which are -- and there's certainly demographic trends embedded in this. And let's start in Southern California and San Diego and some other areas of Southern California.

DR. CORTES: Yeah. Thank you. Okay. So at SanDAG we create we create a forecast every four years to go along with the transportation planning cycle. So the current forecast looks out to 2050 and we're predicting 700,000 additional population, the need for about 400,000 additional housing units, and about 360,000 jobs increasing from the base year. So like I said, most of that growth is in the population 65 and older. So today, it's about 17 percent of the population in the county is 65 or older. In 2050, it would be about 34 percent of the population.

And just a kind of interesting thing that we did was look at the kind of working age, old age dependency ratio. And San Diego County would have a ratio that's near what Japan is today by 2050. So we're definitely paying attention to the way countries, industrialized countries are going to be dealing with that.

Something that's already been touched on is kind of people working longer into retirement, but maybe it doesn't look the same as it does preretirement. Is it part-time? Is it less engagement?

And then also kind of something I think about a lot is the healthcare needs, just the infrastructure for that, hospitals, clinics, things like that, but also the workers. So a lot of the job growth that we see in San Diego County is typically low-wage jobs, so retail, service industries, wait staff, because a lot of the economy is tied to tourism.

But also in healthcare, we are predicting job growth in that capacity. But also -- but, unfortunately, or maybe fortunately, it's kind of in the lower-paying healthcare jobs, so not necessarily doctors and, you know, nurses but home workers and things like that to support people who are deciding to age in place.

So I think that's kind of something that we're interested in, seeing how that would affect the overall growth of the economy in San Diego. And I think there's places to look to, to see how we react to it. But right now, I think it's kind of an unknown.

Oh, well, and then maybe the housing growth. So I would say in past forecasts, we haven't predicted this much need for housing growth. But we've -- San Diego has had a vacancy rate that's been kind of unreasonably low for many years. And in order to kind of balance that, to have something, more of a healthy housing market where people could enter it when they wanted to and not be forced, you know, to rent or have roommates when they don't want to is the reason that we're kind of seeing the need for more housing unit growth. And fortunately, we're also seeing some of the local jurisdictions come around and show capacity for that growth which is something that hasn't happened in the past.

MR. MICHAEL: I'm going to ask the panel for any other insights about Southern California?

And since you're leaving early, Jerry, maybe I'll pick on you again.

MR. NICKELSBURG: Sure. So I think one

thing that we can -- that we need to keep in mind when we're looking at new permits for housing is that over the last two years, we're down 30,000 homes to the wildfires. And so we have, in our forecast, an increase in building from 100,000 going up to, ultimately, just shy of 140,000, but we have 30,000 right now. And in Southern California, in Los Angeles, Ventura and Santa Barbara, it's about 3,000 to 4,000 homes just to stay where we're at.

But what we are seeing is developments further out, longer commuting. So jobs that are being created in Los Angeles County are being created for people who are now living increasingly in the Inland Empire where there's a new project that was just approved, the Tejon Ranch which is actually quite far away from the city, and the Newhall project which is up in the Canyon Country. So we're seeing sort an increase in spread in order to provide additional housing.

But still, the housing growth is not sufficient for continued job growth and economic growth that we've seen, you know, in the last decade.

MR. MICHAEL: You see the housing

constraint being really critical to sort of the L.A. economy. Is there anything sort of in the industry sectors or picture that is happening there that we should make note of?

MR. NICKELSBURG: So I'm not sure how this effects an energy forecast --

MR. MICHAEL: Right.

MR. NICKELSBURG: -- but the Los Angeles economy is one in transition. And if you look at the numbers, you don't see as rapid growth in employment in Los Angeles as you see in some other parts of the state. If you disaggregate Los Angeles to West Los Angeles and the Tri-Cities, which is there the entertainment industry is and where Silicon Beach is, and it looks very much like Silicon Valley.

So what's happening is that Los Angeles was one of the last economies, certainly in the state and in the U.S., who's really dominated by old line manufacturing. And that got hit hard in the last recession. That's kind of going away. Those jobs are not coming back, while these new jobs are happening. So we're seeing a real transformation in L.A.

And just kind of back on housing, we're

seeing more multifamily housing, particularly along the new light rail transit corridors, so we're seeing a lot of change going on. But you know, if you want to disaggregate to get down to energy usage, you've got to be cognizant that we've got different industries that are growing than were growing in the past.

MR. MICHAEL: Well, the overall employment growth, you know, the Inland Empire, I think, in recent years has the fastest overall employment growth in California.

MR. NICKELSBURG: Correct.

MR. MICHAEL: And it's also a commuters' center. Is that -- does that represent any better balance of jobs and population?

MR. NICKELSBURG: So there are two things that are happening in the Inland Empire. One is the near-in cities, that is those that are close to the Los Angeles, Orange County and San Diego borders have experienced a growth in housing and growth in employment, and so that's kind of the commuting, the bedroom communities.

In San Bernardino County, you have enormous growth in logistics. And millions, literally millions of square footage of new warehouses, all of which are leased out prior to getting a certificate of occupancy. And we do a survey of developers. And their view is that this is going to be, you know, has been and will continue to be the norm in the Inland Empire and for industrial space in Los Angeles over the next three years, that there's just simply not enough space.

And that's one of the biggest drivers of employment growth in the Inland Empire, is this logistics industry which is, you know, we talked a bit about retail doing quite well in this last holiday season, it was online retail that was doing quite well. And that speaks well for California's logistics industry.

MR. MICHAEL: So that's a dynamic that we've also seen in Northern California.

MR. NICKELSBURG: Right.

MR. MICHAEL: And I might use that as a transition to bring Cynthia into the discussion to talk a little bit about the Northern California economy, you know, starting off with the Bay Area which has been this economic dynamo this decade. Every data point seems stronger than the last and certainly surpasses my forecast.

So could you tell us a little bit about the Bay Area economy?

DR. KROLL: I'd be happy to. It surpasses my forecast too. And as we go into our new four-year cycle of forecasting, we look at each other and say this can't go on forever. It never has. It's been, in the past, very volatile. And so when it turns around it's often not a pretty picture.

However, at the same time, it's been a very resilient economy, one that, even after a big downslide, comes back with something bigger and better. So what makes it like that? It has, I'd say, all the basic components that make it a strong economy. It has a very strong higher education sector. It's had the advantage of a buildup of lots of talent from the defense industry, which then the money went away and the whole structure of business in that area, as AnnaLee Saxenian identified in her Regional Advantage book, has been -- was, at the time, rather different than many other companies today.

I don't know that it's as different now, but it involved a much more cooperative, collaborative attitude towards work and working with others that involved much more flexibility, and it involved a fluidity of organizational structures so that as needs changed, so did the companies that were growing. Lots of -- and that led to lots of new entrepreneurship, lots of development of new businesses, of new types of industry.

So those -- and around it then, built up the kinds of resources that entrepreneurs, innovators need. The area still captures a large share of the nation's venture capital. And it also has other types of services, like legal services, to help companies as they develop. So it, in turn, has built this agglomeration.

Another thing -- but it's not just Silicon Valley. And in fact, if you look at what's happening to the employment trend, San Francisco has really changed in terms of its share of employment recently. It was the key employment center in the Bay Area about 40 years ago when I started doing this work, and a key finance center. It's really -- it's finance has become much more specialized. It's not a banking center in the way it was, although it still has some key banks. But it has built on the Silicon Valley strength and become a new center of multimedia and social media.

And that's been allowed to happen because the city really changed its attitude towards the way it handled growth. It opened up some areas to encourage business development. It worked with the University of California, San Francisco to build up a whole center for biotech.

And so this is a case, I think, where the local government was really controlling how much growth went in there and changed that picture and it's now a much more dynamic economy than it would have been if those changes hadn't taken place. And it's really, I would say, as important as Silicon Valley in the growth of the region right now.

The area still has -- it has -- you know, it's had a lot of the raw material that you need for this kind of growth but -- and it stands, in some ways, to be competitive in what's still a pretty regulated environment. I don't think it can sustain this forever. And I guess I've been expecting it to turn around. I think it's likely to be respond, to be not that resilient as if the economy goes into recession. I think the Bay Area will also go into recession.

What I see as some of the risks? Well, the housing market continues to be a big risk for the Bay Area, and that's certainly controlling how much employment growth can go there. It's shifting the kinds of employment growth that happens.

And so logistics jobs, for example, are moving out to the Central Valley, although all those millions of square feet of logistics space that go out there don't translate into that many jobs; it's important to keep that in mind. And some of those jobs still stay in the Bay Area because they're just simply distributing a lot of these goods that people order online.

In terms of the housing market, there are a couple of challenges. One is certainly the willingness of communities to take housing, but that's changing. Oakland has had a huge amount of growth in multifamily in the last five years. San Francisco has had -- has put in a lot of multifamily housing. San Jose and other parts, some other parts of Silicon Valley. There is a backlash in some areas. But a lot of it is still high end. And there's a significant proportion that is subsidized for very little and low income. The middle is definitely still missing.

And with the wildfires that were mentioned, the costs of construction are skyrocketing. And so even as space opens up for new building, the ability to actually put those -- to put in something that's affordable to this middle sector of the labor force is still very limited. So that's one thing that can slow things down.

Another is product cycle effects. A typical pattern of these innovative industries is that they expand quickly in the place where they start. But then if they're in an expensive place, like the Bay Area, I guess two things happen. One is that eventually they level off a bit, and also they begin to expand to other places in terms of who they're serving and where they do production.

One of my concerns with the kinds of sectors that we're seeing growing now is that a lot of the demand for that is from millennials, and they're really at their peak right now. But this is now talking about more 20, 30 years hence as we do in our forecast. We can't count on that demand to grow forever. So we're likely to see a reorganization of those sectors. And the question is: Will the valley and will San Francisco come up with a whole new industry that will grow in its place?

I think some of the other risks are migration and immigration policy. We're very dependent on entrepreneurs who come here for their education and stay here and build new industries, and they often do expand their industries outside of the Bay Area. But if they stop coming here because the country is not welcoming, then we lose one source of that innovation.

Another thing that's happening is kind of the maturing of some of our big growth industries. And Apple is a good example of that. Of course, a lot of their growth has happened other places, but they still have a huge workforce in the Bay Area. And it makes me nervous when these companies start building their flagship corporate space because it's a sign that they're really changing in how they think of themselves as a company.

And then we're, also, we're doing a prospective paper right now on how jobs will be changing over the next 30 years as part of our scenario building process for our forecast. And one of the things we're looking at is the effects of automation, artificial intelligence, and the whole change in the work process that we don't think will necessarily be a job killer, it could really be a job grower in places like Silicon Valley but may also change the kinds of jobs that are available, the kinds of incomes that people have and where work takes place.

MR. MICHAEL: Great. Thank you for that.

I'm going to grab one of the threads that you talked about that I think is a nice connection between our economic forecast and transitioning to demography, and that was immigration. And I saw several people on the panel sort of perk up at that topic because we didn't actually really discuss immigration in terms of the economic outlook.

So I don't know, I might -- Irena has been quiet lately, so I might ask for some perspective on that.

MS. ASMUNDSON: Sure. So in both our

demographic and our economic forecasts, we assume that there aren't big changes to migration. So California tends to have net-positive immigration because we get a lot of people from abroad, but then we also lose, on net, quite a few people to other states. You know, part of this is because California tends to be a landing place. And so some of those international immigrants like to move onto other states.

Other parts of it are that there is a sorting effect that happens for California. California is very high tech. It is relatively expensive. To live here comfortably, you have to be relatively wealthy. And so we see more educated people moving into the state and less educated people in California leaving the state for places where it's easier to find those lower-skilled jobs.

So if we were to see a huge crackdown on legal international immigration, that would turn to a negative, probably. So California would, on net, lose people to other states more than we're growing.

And Rachel had mentioned the natural increase. We actually have Figure Demographic

01.

I hope that answers your question, Andrew --

COMMISSIONER MCALLISTER: Yes.

MS. ASMUNDSON: -- about like what we see. And so we're seeing more births than deaths still. At some point, that that's going to equalize a little bit.

MR. MICHAEL: Rachel, you're from our largest border region in San Diego, so any thoughts on the immigration issues?

DR. CORTES: Yeah. I mean, the thing that I was thinking about recently was when the border was actually shut down because of the caravan that was coming over the border. And that really impacted -- I mean, I think there's probably been studies on what -- I don't know what they are, but on the impact of how that, just a day or two of that happening, how it impacted San Diego.

I know, like anecdotally, people come to SanDAG from Tijuana every day, they make that trip every single day. So not being able to make that trip, it effects, I would say, probably every level of industry. And it's not just, you know, these kind of low-paying jobs that we associate with Tijuana and the border cities.

And, yeah, the -- what Irena was saying, also, about attracting kind of -- and also, Cynthia, everyone's been saying, about kind of attracting these higher-education level migrants that are able to stay here because they can afford to. But, yeah, how is that going to change? And where will they go instead? And what will we lose out on if they do? So it's something to think about.

MR. MICHAEL: Jerry?

MR. NICKELSBURG: So we've been talking about this immigration and immigration of highly-skilled individuals and how that benefits California, and it certainly does. But let's suppose just for the moment that the level of immigration stays the same but the criteria that are applied to potential immigrants is oriented towards highly educated and highly skilled. That has a negative impact on California, as well. It has an impact on our agricultural sector. And it has an impact on construction.

And you know, we've all expressed that the limitation of housing and the building of new homes is sort of key to keeping up high growth rates. Well, that's going to create capacity constraints in the construction industry that we really haven't seen before.

So it's not just the highly-skilled immigrants that are important for California, it's really all across the spectrum. And I think that we are kind of moving away from the lower-skilled immigrants who are going to take these kinds of jobs and, yes, maybe ultimately move to other places. But that flow is important, particularly in the agricultural sector.

MR. MICHAEL: Adam, are you still on the line?

MR. KAMINS: I'm still here.

MR. MICHAEL: Yeah. Okay.

MR. KAMINS: Yeah.

MR. MICHAEL: Any comment, talking about that?

MR. KAMINS: Yeah. Absolutely. I think, so I agree with what's being said about the impact of immigrants broadly across, you know, highly-skilled, lower-skilled industries. I also think from just a demand perspective; you need to think about what the impacts would be.

So California, actually, you know, where I am in the northeast, this is more of a concern, but California, actually, in some ways mirrors the northeast in this respect much more than it does the rest of the west int hat if you strip out international immigration and just look at natural population growth and domestic migration where, of course, as some of the panelists are saying, California, on net, is losing residents to other states, eventually, by the time you get 10, 15, 20 years out, you would be looking at population losses, not gains.

And so generally, if you are going to lose, you know, a large share of skilled, unskilled immigrants, whatever the case may be, not only are you losing, you know, potential innovation and a source of labor, but it also would have a significant effect on consumer industries and on just consumption and housing demand in general.

So I think, you know, really, it’s a pronounced issue across the U.S. But I’m hard pressed to think of a state where immigration means more than California.

MR. MICHAEL: Okay. I think let’s

transition to -- we've been sort of touching on aspects of demography, but let's transition to a little bit more detailed discussion of demography in housing.

And I think Irena mentioned the 2018 growth estimate from Department of Finance, 0.54 percent population growth. U.S. Census had an estimate that came out recently that was actually a little bit lower, 0.4 percent. I don't have DOF, you know, 100 years of DOF's estimates on my desktop, but Census I do. And you know, that was one of the numbers that I noticed recently. I went back in history and I think that was the lowest one-year percentage growth the Census had estimated for California's population going back to 1900. It had gotten close a few years in the '90s but I think that was the lowest. So clearly, we have a slowing population growth in 2018.

So I'm going to ask Irena to talk a little, in a little more detail, about Department of Finance's estimates and projection going forward. You know, is this the new normal?

MS. ASMUNDSON: So over my time at Finance, I have learned far more about demography, so Rachel can jump in tell me if I'm saying something that it is a little bit misinterpretation of the data.

So we use a number of different sources. You know, we use Department of Homeland Security sources. We use births and deaths from the Vital Statistics. We also use, for example, DMV's statistics about who is where. And we use IRS data to look at who has moved to other states.

And so one of the reasons why Census had such a lower number than we did is because they had some access to data and they interpreted it in a particular way that showed, actually, that far more people were leaving California than what we had assumed.

And so we're going to be looking at our methodology over the next couple of months to try to figure out, yeah, is that a good interpretation? And, in fact, are we seeing some of the housing constraints that we've been talking about for several years now. Is that actually really having an effect on what people are choosing to do and where they choose to live?

And, you know, I've had several conversations with Cynthia and Jerry and other colleagues about, you know, in economics there's really only one law left which is if something is unsustainable, it has to stop. It's just a question of when it's going to stop.

But the levels of housing in California are so low compared to what our population is. Part of that could be that there are accessory dwelling units that haven't been permitted and so aren't included in our stock.

But I keep coming back to the statistic of one in five California households pays at least 50 percent of their income in housing costs. That is -- that's shocking, one in five households. So if you have a dual-income household and you're paying 50 percent of your household income in housing costs, if someone loses their job, you're basically homeless the next day. Okay, maybe not that extreme. But you really are kind of living on the edge. And so what are these people going to do when that recession happens? Do they have the means to leave the state or do we just have this terrible situation?

The other statistic that I do want to mention in terms of demographics, we have looked at a number of different ways of calculating how many housing units you need to just to sort of keep up with population growth. And for a while, I think HCD and us were -- and LAO, I think, as well, were using the number 180,000 units every year to keep up with population growth.

We looked at the past history and we upgraded that, actually, because a lot of the building more recently has been you demolish single-family homes and upzone it, so then you build multifamily housing. So you need a certain amount of destruction to do this infill, and so that’s maybe about 10,000 units a year. And then because of the new normal of all the disasters, that’s probably another 10,000. So we’re saying the new benchmark that you need in terms of housing is probably around 200,000. We’re nowhere close to that. I think, it looks like, 2018 will probably have gotten around 120,000. And in our forecast period, we don’t get anywhere close to the 200,000.

MR. MICHAEL: So I’m just going to make an observation because last year’s population estimate was less than 200,000 new Californians. So wouldn’t -- was it not low, .5? I don’t know, we can do the math.

MS. ASMUNDSON: Right.

MR. MICHAEL: But I mean, that calculation of just to keep up, you know, embedded in that is that we're going to return to at least a somewhat higher level of population growth than we are today?

MS. ASMUNDSON: No. So, okay, these things don't necessarily track. And here is where, I think in your forecast, you probably should maybe think about the underlying trends that are changing a little bit. When we look at these trends, we look at adults. And so we have a much lower birthrate now than we used to. And so the number of people who are becoming adults who you would normally think of as establishing households, that is higher than the total net population.

So we benchmark our numbers to the increase in the number of adults, not the total increase in the number of people.

MR. MICHAEL: So that's one of the interesting drivers, actually, declining birthrates. I think we've all seen that in the data. I'm wondering maybe, Rachel, do you have any comments on the trends there and where we expect that to go?

DR. CORTES: Maybe just to talk about kind of the housing need versus like the adults. And then -- because I think in San Diego, you know, we're talking about building this forecast, it's like what we anticipate the need being and not kind of keeping the status quo of having multiple families, you know, multiple roommate situations. And we're anticipating family size going down as the population increases.

So it's kind of like we're anticipating this need because we know that the kind of style that people live in isn't -- we don't anticipate that to be the same as it is today, people taking on multiple roommates in their thirties and forties and fifties and sixties. You just don't -- you don't see that in the United States. And so we need more units to kind of keep up with that growth so people can live the way they want to live and not be forced to triple up because there's no units available.

San Diego County has a lot of, you know, non-White migrants coming in. And they kind of keep our birthrate at -- you know, I'm pretty sure we’re below replacement but not too far below replacement levels. And so we really, just like the rest of kind of the United States and, I guess, California rely on the higher birthrates of recent immigrants to kind of keep us above replacement levels, and I think that might decline. I think a lot of times, I don’t know how the DOS does it, but kind of assuming that all of those kind of converge in the future and then we’re all kind of washing out that advantage in the next 20 or 30 years, so --

MR. MICHAEL: Yeah. So anybody else have observations on this population versus household growth issue? I think that’s an interesting topic.

MR. NICKELSBURG: Just one point on that. Declining birthrates are not a California phenomenon, they’re a worldwide phenomenon. And so anywhere in the world where you have a reasonably affluent population or educated population, birthrates have been plummeting and have been for decades, and that includes China today is less than replacement and their population is shrinking.

So the only reason why the U.S. has

defied this trend is immigration, and so that's the U.S. overall, certainly for California. And one can expect that to continue, especially if immigration becomes tighter, and birthrates will continue to fall. They might level out at some level but definitely not replacement.

MR. MICHAEL: On the housing question there's been some discussion about what some of the job centers and the coastal population centers are doing with respect to housing. And some of the comments have actually been kind of optimistic, maybe that there is starting to be a little bit more production. So I'm interested in, you know, what do we see for current housing production and future housing production? Could we actually see the situation improve in some of the employment centers and the coastal areas of California?

DR. KROLL: I would say current production is improving but we're far from building the level that we estimate we need annually to meet the employment growth pressure. And we have a lot of discussion in doing our forecasts as to how much we should take that housing limitation into account as we predict how much employment we're going to get. So that's a real challenge for us.

I think it's also -- I brought this up a little bit, the challenges to whether we're building the right housing in the right place for -- and for the population now versus the population 10 or 20 years from now. And I want to reiterate the point that I think Rachel made, that we -- that as the millennials move out of their, what I think as their apartment years into their family-forming years, they may not have as many children but there will be a share of them that really want that -- we can't necessarily count on their wanting to stay in the urban centers.

And so another dilemma that we're really facing is where to encourage growth within the region, what kinds of places? Do we try to build denser places around smaller communities but that allow for single-family homes, as well? Or do we really hope that if what's available is multifamily, that's where people will choose to live?

I wanted to bring up something about energy use, too, because I think, also, you talked about as older people move out of their homes where they're often using much more space than they need and perhaps not using that much energy in that space and younger families move in, even if the housing numbers don't go up that much, there may be some real increases in the amount of demand for energy. But, of course, hopefully it's all going to be built in a much more efficient way.

MR. MICHAEL: Let's talk a little. I noticed, I observed Cary's slide about population growth in various regions of the state of California. I work primarily here in Sacramento and the North San Joaquin Valley areas. That's one of the regions that he has a relatively fast population growth in this area, as well as the Inland Empire. We've seen significant increases in commuting. I think north San Joaquin Valley, Stockton-Modesto area is not over something like 86,000 daily commuters. It's been growing at about six percent a year over the past -- this decade, and that's certainly part of the population growth we see there. Not quite as a strong a flow as from Sacramento, I know it's a little further away, but that's growing in this region, as well.

But one of the interesting observations that I had from Cary’s slide is that if we look at where the fastest and the slowest population growth in the state is, is that the answer to both those questions is outside the coastal and metro areas. So the fastest population growth in the state are in some of these inland areas that we’ve discussed. But we have parts of California that actually have declining population.

And so I think if we look at the areas of California that are growing faster and which are declining in population, I’m wondering if we have some observations on that issue and maybe the expectation for the future? I don’t know.

MR. NICKELSBURG: Well, and let me make just a couple of comments, but I haven’t really delved deeply into it.

So one of the areas that that slide showed was losing population of the northern counties in the state. And their economies were built on mining and logging and fishing. And those industries, you know, are maybe not gone but they’re very much diminished. There has been expressed a lot of hope that the cannabis industry would revive that part of the state. It looks like that's going to be quite modest. And so I think that you can expect continued population declines.

If you look at the age distribution in those counties, young people are moving out. It's, you know, kind of like West Virginia where the young people and the educated people move out. And you see the same thing on the east slope of the Sierra. And in the Central Valley, I think probably Kings County and some of the other counties that are really predominantly agriculture, as agriculture continues to mechanize, due to the shortage of agricultural labor, you may see that.

The one area that I think bears, you know, a real close look is the Central Coast, so that's Santa Cruz County all the way down to Santa Barbara County. It doesn't seem to have shared the growth in California and has really lagged behind, has looked very much like a number of inland areas. And whether that will start to grow again, and, you know, there's plenty of room for additional population, but it doesn't seem to be happening. So I think that's a place to kind of focus on because more centrally located seems like it's more advantageous but it's definitely not sharing in the prosperity that we're seeing in other parts of coastal California.

MR. MICHAEL: That's an interesting observation. I mean, we're seeing actual population declines in some of the rural areas, and we're seeing the fastest growth in some of these, you know, inland areas that are proximate to the employment centers. But you know, some of these areas that are a little bit further out that haven't seen the declines, Central Coast being a region, perhaps areas deeper into the Central Valley, like the Fresno area, I believe those areas have continued to show growth but it's been slower than in the past. So it's -- I don't have a prediction on that but it is interesting that we've seen some places that were slow growing sort of dip to negative and some areas that are faster growing, if they're not close to those urban centers, I've seen a similar story.

DR. KROLL: Yeah. I wonder how the tourism industry is playing into this, too, particularly in the Central Coast where you have -- may not have -- you may have a declining population there but you may still have a continuing housing occupancy there by visitors? Probably not so much in the Northern California counties along the Central Coast, I think that could probably be part of what's going on.

COMMISSIONER MCALLISTER: Cary, can I ask a quick question on this?

On the housing front, I guess, you know, we're holding a lot of hope, putting a lot of hope and aspiration in densification of housing. And, you know, I think you've all mentioned that in some way. Do we know if there are -- sort of what densification, what policy -- you know, because densification, do you think much of what's happening is driven by policy or is there a market driver, as well? Like what do we have to do to kind of get more infill which has all sorts of environmental advantages but, you know, do people want it? It's sort of the demographics of that is something that I'm not sure we understand, but maybe you guys have looked at that.

MS. ASMUNDSON: You've put your finger on the question that everyone wants to know the answer to. You know, you look at all of these trends and either these trends just have to stop and California has to stop growing at the same rate that it has been growing or you can get this densification.

The thing that happened recently that really kind of frightened me about sort of how the economic incentives are working is the fact that Amazon decided not to go to a relatively cheap place with relatively good infrastructure that might have a university. I'm thinking something like Pittsburgh or St. Louis, or, you know, even Detroit, where they could have gotten a lot more bang for their buck. They decided to go to someplace that was already relatively crowded, relatively built up, relatively expensive. And so that seems to be that they're making a bet on they want to be where all of the other people are.

And so you do -- this, to me, means that you do need increased densification. We don't know how to do this because people don't like to change the character of their neighborhood. And in California, as well, we have this wedge in incentives for economics whereby homeowners, because of Prop 13, don't face any of the higher housing costs. In fact, they like it when the price of their asset appreciates by a lot. And so if they tend to be voters, then they block additional housing and it benefits them, but it doesn't benefit the overall economy.

MR. MICHAEL: I mean, there's some -- so, I mean, if local policy is a constraint here, there's some discussion in Sacramento of the state taking on a stronger position with respect to local governments and their sort of powers to control and shape housing and growth. Will that make a difference, if policy gets more aggressive to prevent those sorts of blocking techniques? Is there a market for it? Do you think we'll see significant growth?

Rachel? Yeah.

DR. CORTES: I don't know about the state, but I know in like our local jurisdictions, one of them doesn't have a state-approved housing element for the low-income housing and the allocation that they're asked to do every other planning cycle. And I think what happened there is that every time something kind of comes up, they vote it down. And so I think there's some kind of -- there's been -- it's kind of been like you have to have a housing element. Okay, well, what happens if I don't? Nothing.

So if something actually happened, if they didn't have -- if they don't have this housing element -- and then I think what I've heard is that they'll be forced to have kind of development in places where it was initially voted down. I mean, it has to have an impact but I don't know how quickly that could really take place.

But -- and then I would also kind of -- I just wanted to say, like in San Diego, the city is really the one who's kind of needing the housing, the housing kind of needs. They're really open to building housing. And most of that in the city is infill and it's redevelopment.

And so what I'm thinking is if they actually build any of it, that people will come to it because it is closer to employment centers and it's in an urbanized area where it's very close to the beach, so it's an attraction. So maybe people won't have to kind of come in from Temecula and other counties.

So that's what we're seeing.

MR. MICHAEL: Is there a strong market for denser housing if we can permit it?

MR. NICKELSBURG: So, I mean, there are two questions here, there's a demand and a supply question. Being an economist, I like both. The demand is an open question as to is there a demand for denser housing? Well, there seems to be a demand for multifamily housing. Rental rates keep going up and they're going up faster than the increase in the supply would suggest, you know, would suggest. So it appears there is excess demand for multifamily housing and that's what we see in rents.

But there's also, on the supply side, there are capacity constraints. Even if the state and local governments eased rules tomorrow, we don't have the construction workers to build that housing. And we're seeing that in Sonoma County in the rebuilding, we're seeing it in Southern California in the rebuilding from the Thomas Fire, that we have hit capacity constraints in construction labor. So it used to be that you would ask contractors kind of, what are the obstacles to building and you'd have a whole lot of regulations, and labor was not one of them. Labor is now a significant constraint.

So if we're talking about a longer run, sure. But is there going to be much change in the amount of building we have in the near term? I don't think we have the capacity to build any more rapidly than about 140,000. And if Irena's analysis is correct, I think it may be conservative, but 200,000 homes, we're not going to get there, not in the near term, not even close.

MR. MICHAEL: So there's a constraint, yeah, and not just labor. And I'll echo this, that I work a lot with building, both commercial and residential. And it seemed like for the longest time their complaints were regulatory, fees. But I would say for the past two years their primary concern has been costs, and not just labor but materials.

Just this week, I was working with a major electrical contractor and they were talking about bidding out some large, new projects and how their costs had escalated 12 percent over the past year and working with the customer and the prime contractor. And they said, well, that's actually the lowest we've heard from any of them, that the other bidders on the project have actually even seen higher percentage increases in costs.

So this is sort of, I suppose, a third issue is even if we start to permit it, we've got some extremely high costs of construction that could leave us maybe a bit disappointed in the response that we get.

COMMISSIONER HOCHSCHILD: Actually, can I ask a question related to that?

I'm sure many of you are aware of the new trend in residential construction of prefab homes. So I visited one of those facilities this year, Rick Holliday's shop out on Mare Island, where they're doing, basically, these -- it's like, essentially, an assembly line for homes. They're building all-electric modular homes that are -- the dimensions are such that they can put one-half of the home on a semi-truck, so basically two trucks to deliver a home. And they're doing it, I think, for like $65,000. They have contracts with UC Berkeley and elsewhere.

I was pretty excited to see it, also,

because there's no material waste when you know the dimensions and everything is standard.

So is that a trend you could see growing significantly or are there real constraints? Because also, just in terms of advancing the affordability of homes, it seemed promising. I'm just curious if anyone on the panel has opinions on that?

MR. MICHAEL: I can say a little bit about it, but if others want to jump in?

I'll just say, that was an industry that I think does have some potential. Ten years ago I was -- I heard something about it, and then I think it sort of fizzled in the recession. Even when you talk to the builders themselves, like not even a prefab home, like the electrical company I was talking about is the way they're getting more efficient is building and doing more of the work in the shop before it goes to the site. And so even in that, a non-sort of factory built situation, you're seeing more offsite production to lower costs for the same reason.

There are a couple of interesting startups. I'm not quite sure where the -- you know, they're sort of niche products now. It's going to be interesting to see what the demand and the acceptance from planners are. But there's certainly, I think, an area that has potential for growth. And even when you look at the industry outlooks for areas, you talked about Mare Island, there's Solano County, we're seeing some new investment in the north San Joaquin Valley and businesses that are starting to build these sorts of productions, we may see that in the Inland Empire. But if that gains traction and reaches its potential it also has the ability to, you know, provide a little bit of an economic boost to some of these inland halo counties and reduce commuting of construction workers.

So you know, I'm encouraged by the potential of that but I'm not, at this point, I'm not sure that it's -- how large it can get.

CHAIR WEISENMILLER: Yeah.

MS. ASMUNDSON: I would also want to say, it's difficult to get the kind of scale that you would need because it's much more difficult to get modular prefab houses for multifamily. You know, you can do some of it. You can do parts of the framing and then you assemble parts of the framing. But, yeah, and also, you know, this tiny house movement, I've been looking at Instagram's of tiny homes, it's really cute but, you know, that's sort of like densification of existing single-family homes. It's not really getting the scale that you would kind of need.

So every little bit helps. But if you want to get to the scale that you need, you kind of need a fundamental change in how people think about things.

CHAIR WEISENMILLER: Okay. I just have a couple questions.

One is I was hoping to get people's reaction to the impact of climate change on California's economy. We obviously have fires. We have sea level rise. Now we have the PG&E bankruptcy. So, please.

MS. ASMUNDSON: All right. So I can't say how I think it is going to be fixed but I will point out a couple of things where there are some inconsistent trends that I think that we need to worry about.

So one is we have not built enough housing where the jobs are. And so people have incentives to move to less urban areas and do these long commutes or retire to these, you know, less urban areas where, potentially, the risk is higher. I think Paradise was kind of a really good example of this. People had moved there. They didn't have insurance because they couldn't afford it. They were kind of wiped out. They tended to be older.

And this is one of the consequences of the inconsistent set of policies that we have where all of the jobs are increasingly densely located and we don't have the housing for it, so you kind of like push people out. That also is places where it's riskier and it is more prone to be affected by climate change.

And so if you wanted sort of a consistent set of policies, you would put people where they are a little bit more protected from those natural disasters and also closer -- and if you want to reduce emissions or reduce demand, they would have to be located closer to where the jobs are. And the way the set of incentives are set up right now, it's not consistent.

MR. MICHAEL: Thoughts on climate change from other panelists?

DR. KROLL: Well, I think there's also risk of losing housing to climate change and that's losing potential areas where we would have built.

So at the same time, it's a -- and responding to climate change is an area of business growth in California. So there's a whole balance between what it's doing to our housing stock, what it's doing to our natural environment, and how the economy is responding. There's a lot of growth involved in trying to respond to it.

MR. NICKELSBURG: So let me just, in my last comment before I have to run and teach, echo that.

Now California does not have as much in the way of low-lying housing as many other states. And so that's -- if there's any good news in this, that would be sort of the differential good news. But we do have low-lying housing and we have infrastructure that's going to have to be rebuilt with rising sea levels. And then we do have a new climate that's coming that's going to change agriculture, it's going to change the way in which people live, it's going to change other industries. That kind of change will generate economic activity and a lot depends on how its managed.

So you know, I think we're at least fortunate that here in California, we're thinking about this, and some other places in the U.S., they're not, but it's a huge challenge.

MR. MICHAEL: Well --

MR. NICKELSBURG: And with that, let me thank you for the invitation, and I'm off to teach.

CHAIR WEISENMILLER: Well, actually, I want to thank you for both.

As you're leaving, I want to pop another question which is just when I've been in China, either under the Obama administration or under the current administration, the basic message was the Chinese really want to invest in California, but the message from the Trump administration, the ambassador, and certainly what the Chinese determined to hear is do not send money to California, send it to Ohio, send it various republican strongholds. Now what -- you know, and that's -- as a solution to the trade war, what they're trying to negotiate.

What happens to California in this trade war with China, particularly if Trump succeeds in really shifting investment and opportunity between California and China into more the Midwest?

MR. MICHAEL: So, yeah, there's a lot of angles to that. Some of it is effects on investment. Some of it is -- could be trades and ports themselves. So I think maybe a piece of the time on that, I mean, and I'm looking at Cynthia about Chinese investment, but certainly we see that in the Bay Area, observations there?

DR. KROLL: I think I'm more concerned with what's happening with the Chinese economy overall and Chinese demand than I am with Trump administration efforts to divert Chinese investments to other states. I think that that Chinese demand is a significant part of the growth of a number of our industries in the Bay Area. And as that's slowing right now, that could be one of the things that slows the growth of demand for their products.

MR. KAMINS: This is Adam. I also wanted to -- oh. I'm sorry. I wanted to add that I think one of the things that we've looked at nationally with Chinese investments flowing into the U.S. is the impact on real estate markets.

And I think about the Bay Area market, for example, that relies on a lot on Chinese capital. And I don't know if the Trump administration's efforts to divert investment to other states is sort of the impetus for this.

But as, you know, sort of as mentioned, as the Chinese economy slows and if the trade war intensifies, I mean, that becomes a real worry for real estate markets in gateway cities, and so that could be a problem for a place like San Francisco or Los Angeles.

DR. KROLL: So how much of that is buying up property versus investing in building? Because on the one side, it effects the price, and prices going down might be good in the Bay Area.

MR. KAMINS: Um-hmm.

DR. KROLL: And on the other side it effects building which reduces supply.

MR. KAMINS: Right. No, I think, I mean, it kind of impacts both channels, so you're right. I mean, if you create some price relief, that actually could be a good thing in the short run. But I think on the whole it's, I mean, it is a negative, especially because I would think like, you know, the Bay Area, the housing market, yes, there's supply shortages in that, that's putting a lot of upward pressure on prices. There's, you know, obviously demand. But because it's -- you know, the unemployment rate is so low already, because it's an economy that can run a little bit hot and cold that, you know, you worry that sort of a slowing economy in combination with slower investment from overseas, that to me becomes a worrisome formula.

MS. ASMUNDSON: Let me just add one other thing. You know, I think the focus on the overall amount of investment is probably correct. And there are some subtleties about what happens and where it's going.

But you know, even though I am California, like if those places in the Midwest started to do much better, California would also do better because we are so tightly tied to how well the U.S. is doing. And you know, I said before, I have been worried about how slowly growth has been spreading in these very urban centers to sort of normal people. You need that consumption base. You need lots of people in the U.S. to do well. And so if that policy actually sparked a lot of growth in the Midwest and had those people do better I think, ultimately, that's good for California. And it's not really a zero-sum game because it would be a different kind of investment. Unfortunately, I don't think that it's very likely that the Trump administration is going to have much of an impact on Chinese decisions like that.

CHAIR WEISENMILLER: Actually, the last question I have is just we've talked about the economy and the differences, it seemed like we have. How likely is it, the growth or separation of, basically, two Californias going forward, the sort of very affluent, very vibrant coastal areas with lots of growth and more the inland, you know, not quite west belt but, you know, sort of Silicon Valley versus Fresno? You know, how much are people worried about those trends? And is there anything we can do to deal with that, to make it more equality within California?

MR. MICHAEL: I'll make a little bit of observation, is that, you know, the coastal versus inland California, there are differences. So there are parts of the inland areas like, for instance, Sacramento and the north San Joaquin

Valley that are becoming more and more connected to the coastal economy. So we've been talking a lot in this region about the Northern California megaregion. We're seeing these increasing commuter flows. Now we've seen the Amazon and the distribution logistics industry sort of decamp inland. We're starting to look at other sorts of industries that could spring out from that, modular home construction being one of the examples that people talk about.

So I think for some of these inland areas that are proximate to the coastal areas that have lagged behind, I think the answer to that is, you know, improving the positive connections to the coastal economy.

Other parts of inland areas, we've talked about Northern California or deeper in the valley, and Jerry bringing up an interesting example of the Central Coast, a little bit harder to build that connectivity. I'm not real optimistic that high-speed rail would even do that for Fresno. And so that becomes challenging. And I think some of those areas, too, are probably some of the areas that might face some of the significant climate change challenges that you were talking about earlier, whether that's the agricultural or more resource-based economies. The lower incomes could be very, very challenged by it.

And so I think there's sort of, you know, maybe another set of strategies we need to think about for these areas where it's not sort of realistic to build connections with the coastal economy, or less realistic.

DR. KROLL: Well, you said most of what I was going to say, but you did inspire some other thoughts because one of my earlier iterations, long before I came to ABAGNTC, I did a big study on the Northern California timber region and how that prospects were changing that. And I think we face a real dilemma in that area right now because of climate change. I mean, I think there were areas within those changing economies where people were moving in from the coast.

I can imagine now, with all of the telecommunication options, that you could really make it -- make some of these areas attractive places for people to live and build businesses. Not everybody's going to do that but there's certainly a population within California that would be interested in that, but at what cost in terms of protecting those communities, building them in a way that's safe, protecting the environment in those communities, and then the displacement of the people who are there?

So it's a challenging question.

MS. ASMUNDSON: One other thing that I also wanted to mention is that inequality is not just by region. And California is also very much, you know, see homeless people everywhere in the urban areas. There's still lots of people who have sort of managed to hang on, who are lower paid, who are lower skilled, who are kind of living on the edge in these urban areas. And so they might have access to the opportunities to sort of like find a new job, but they also can really get shut out.

And so it's not just a question of inland versus coastal but it's also within each region, you have to worry about inequality a little bit.

MR. MICHAEL: We have just a few more minutes. So as a final question, I'm just going to ask each panelist about if there's a major demographic or economic trend that maybe people are unaware of or that we haven't talked about today that you think we'll be talking about more in the future? That's a tough one off the cuff, but Irena's --

MS. ASMUNDSON: I did mean to mention, so over time, over sort of modern times we've had increasing life expectancy which has kind of stalled, actually, recently. And part of that is that people are less healthy. There's a lot more obesity. Part of that is opioids. So a lot of that also speaks to inequality because for wealthy people, life expectancy could -- for educated people, life expectancy continues to increase. For the less educated, the picture is not looking good.

MR. MICHAEL: Rachel?

DR. CORTES: I'll try to follow that, but we're all going to die. And thank you for having me.

I guess I would just say in the work that I've done at SanDAG the most kind of uplifting part of it would be to see like the local jurisdictions kind of willingness now to kind of go back to the table and develop these units in places that, hopefully, we'll see them built in the near future. So I think things seem to be --

I've only been at SanDAG for four years and I can kind of see a shift in people's thinking in that area.

COMMISSIONER MCALLISTER: Are there any particular jurisdictions that you would sort of hold up as really thinking progressively or innovatively about this?

DR. CORTES: Yeah. The City of San Diego is very progressive. Chula Vista is very progressive too. They're really willing to put in a lot of residential and nonresidential development, so I think they're getting a new university in the south. It's kind of those small coastal towns that are still really resistant and like to tell us that they're already built out. San Marcos also has a university that's growing a lot, so they're going to be taking in a lot of new multifamily development.

So there's kind of a spread around the whole county, but there's definitely places where people are open to this and they're doing what they can to get it done.

MR. MICHAEL: Adam, I want to give you a chance to chime in with a final thought?

MR. KAMINS: Sure. Yeah. I think some of the bigger trends or some of -- a lot of what we've talked about was sort of the divide between large dynamic areas or smaller areas. Maybe one demographic trend that we're watching pretty closely is that historically there is a bit of a relationship between how the national economy is doing, just the extent to which people move, that when times are really good, when the unemployment rate is low, you get more mobility across state lines, which actually hurts California because, right, when the economy is really strong and cost differences matter more where there's a net outflow of state-to-state migration would be hurt. We haven't really seen that the last couple of years now in the data where there doesn't seem to be as much of a relationship there.

So I mean, our working assumption is that that sort of will return to normalcy to some extent, that you're going to see this relationship between economic strength and overall migration reemerge a little bit. But I think that's something that bears really close watching and it could matter a lot for the demographic picture in California.

MR. MICHAEL: All right. So, so far we've got declining mobility. We've got some declining life expectancy in certain groups. We have a change in attitudes in some coastal regions.

And so, Cynthia, you get the last word.

DR. KROLL: I guess my last word is watch the millennials, that I think there's a tendency to think -- to focus on what a generation is doing and thinking of it as a generational characteristic, they drive less, they like to live in cities and so forth. I think we should watch carefully what the oldest millennials do as they move into their thirties and forties. Are they going to revert back to what those H-cohorts (phonetic) did or are they going to continue to really bring a new style to urban and regional development?

MR. MICHAEL: Well, I think we're on time.

CHAIR WEISENMILLER: Excellent. Well, I want to thank all of you.

And at the same time, I believe we're set up for public comment now, so, okay.

MS. RAITT: Sorry. We provided the opportunity for questions after each panel. So I don't know if there are folks in the room that had a question for our panelists? This would be an opportunity to do that.

CHAIR WEISENMILLER: Please come up, Bob, to the microphone and identify yourself.

MR. RAYMER: Thank you, Mr. Chair. Mr. Chair, can you hear? Okay. Yeah. Bob Raymer with the California Building Industry Association. I'll be on the panel at one o'clock, but I was listening. And I couldn't get parking earlier today, so it's a crazy day out there.

Anyway, for what it's worth, I've brought our updated chart. This is basically what we've been doing in both residential and single-family home construction, dating back to 2004. And I heard this morning there were projections of perhaps 130,000 to 140,000 units total, both multifamily and single-family for 2019, '20, moving into '21. This afternoon, we'll talk briefly about that's not happening.

I can tell you right now, and I spoke with our statistician as I was leaving to make sure nothing has changed, but we've seen a just drop-to-the-floor reduction in permits that are getting pulled in some of our major urban areas where we would normally expect to see some robust construction. We're seeing a reduction of permits getting pulled at a level of about 50 percent. And I'll speak later today as to why that's happening, but the short story is a lack of finished lots, and enormous labor shortages exacerbated by the fires and, of course, the pricing pressure that you've talked to. We expect in 2019 to do less units than we did this year. And right now we're 2018, we'll have about 119,000 total units. And we'll do significantly below that for 2019 and '20.

CHAIR WEISENMILLER: Do you know anything about -- do you have a sense of the split between single-family and multifamily --

MR. RAYMER: Yeah.

CHAIR WEISENMILLER: -- the trend there?

MR. RAYMER: Multifamily is still hanging in there. Normally, if you go way back, '80s, '90s, the 2000s, multifamily was about one-third, single-family was about two-thirds. And then for about five years it completely flip-flopped. As we were coming out of the downturn, you know, the 2009-2010 period, we had about five or six years where multifamily was doing two-thirds of our construction. It's now sort of evened out.

But once again, as the panelists have indicated, it depends where you're talking about. What I am seeing is high-density single-family home construction. Millennials, as they begin to have children, sort of like the single-family, you know, home that's kind of, sort of segregated, but they're not having a problem with high density which is helping keep the prices down. And that's definitely coming on here in Sacramento. If you're coming up 580 from the 49ers new stadium in Santa Clara, all of those homes you see as you head north there to right of the Shea Home projects or whatever, all of those are three-story, single-family homes that are within six feet of each other.

CHAIR WEISENMILLER: Wow. Yeah.

MR. RAYMER: So anyway --

CHAIR WEISENMILLER: So --

MR. RAYMER: -- I'll do more today, so --

CHAIR WEISENMILLER: -- the last question for you here is my impression, trend-wise, is that there's not as much development in the urban cores, so it's basically people driving until they hit affordability.

MR. RAYMER: Yes.

CHAIR WEISENMILLER: So I assume there's more of that remote --

MR. RAYMER: And it's a problem. Number one, I live in South Elk Grove. At least three of the six families that live around me are commuting every day to the Bay Area. And so you're seeing that in Lathrop, Manteca, et cetera. But Elk Grove, people are doing that three-hour trek one way. And this is not -- that's not good.

And so anyway, I'll be here this afternoon, we'll have more. Like I said, I brought 100 charts, so on the way out --

CHAIR WEISENMILLER: Any other questions from anyone in the room?

Please, come on up. Identify yourself.

MR. MARTINEZ: Ed Martinez with Southern California Edison. I'll also be on the panel this afternoon.

So as a panelist, I'll be kind of interested to see, I guess the impact of sort the first year on the cap on the state and local tax deductions. And I think people now are finally doing those tax returns now. And I'm wondering, I guess, just any kind of guesses or insight into that?

MS. ASMUNDSON: I think I'm supposed to answer that question.

So in our forecast, we don't assume that there is too much out-migration. The state revenues are highly dependent on the top income earners and those are the ones for whom this limitation would apply to the most. So it could be that we end up being very wrong about this, but in our forecast we don't assume that those people will often leave California.

MR. MICHAEL: Potential -- when this was passed we were wondering about the impact on housing demand because it's connected to mortgage interest limits and your ability to deduct. So I think it's one of the factors that is slowing a little bit of the housing from the demand side. But people -- I don't think the average person is fully aware of it. Maybe they'll gain a little bit more recognition this year as they're completing their taxes. But I think most people will be -- may not dig into the details unless they see, you know, an increase in their taxes. I think it will be relatively small for the population.

MR. MARTINEZ: Thanks.

CHAIR WEISENMILLER: Chris?

MR. KAVALEC: Chris Kavalec, Energy Commission. I guess this question would be for Adam.

The panelists talked a little bit about the logistics industry and warehousing supporting online stores. And I was wondering if you had any sense or anybody has any sense of whether we're close to reaching an equilibrium between online stores and brick and mortar, or are we still like right in the middle of a shift to online stores --

MR. KAMINS: Sure. Yeah, I can.

MR. KAVALEC: -- and so the --

MR. KAMINS: Yeah. I can talk about that. I don't think we're near equilibrium. I think if you look over a 15- or 20-year horizon, there's actually data on online retail sales versus traditional retail. And there's a pretty steady half point to one percentage point increase in the share of sales that the Census Bureau classified as online every year. And if anything, that's actually showing signs of accelerating.

Now I think, you know, in terms of retail space and just thinking about kind of, you know, some kind of a property perspective, I think retail is beginning to find its footing in some ways. I think that there was this sort of tectonic shift in terms of, you know, what the retail world looked like. And I think in some parts of the country, I think that's still an issue where kind of traditional strip malls and shopping centers are struggling, you know, retailers like Sears and Target and others that are still struggling under this new model.

But I think you are seeing maybe a little bit more of a shift towards experiential retail and where retail is kind of -- you know, properties that we traditionally think of as being retail where stuff is being sold as sort of an experience, whether it's, you know, an eating experience in a restaurant or other kind of activity, is sort of taking over.

So all that's to say that I think there's a lot more growth to come in the logistics industry. But I also am not as worried about sort of the doom and gloom that people are talking about with retail outside of kind of a few sectors.

MR. KAVALEC: Thanks Adam.

MR. KAMINS: Sure.

MS. ASMUNDSON: Can I add something? So one other thing about the logistics and about people buying stuff, I think Adam is right about the experiential stuff. But if people are commuting three hours each way twice a day, that also leaves a lot less time to go shopping and doing that traditional stuff. So I think that those two trends interact and that you'll see much more online.

MR. MICHAEL: I would say I think we're very much just in the middle of a shift. I think we haven't even reached 20 percent of consumer spending online. It's been growing by about a percentage point a year. I'm not quite sure where it ends but I'm confident that there's a lot more room to grown.

MS. RAITT: Okay. All right. If there are no more questions in the room, and we don't have any on WebEx, so then I think we can go ahead and break. Back at 1:00?

CHAIR WEISENMILLER: Back at 1:00, yeah. Thanks again.

(Off the record at 12:08 p.m.)

(On the record at 1:03 p.m.)

MS. RAITT: All right, I think we're ready to start again, this workshop for IEPR 2019. And so we have Panel II which is on Regional Economic Prospects for Business and Industry. And our Moderator is Louis Bedsworth from the Strategic Growth Council.

MS. BEDSWORTH: Okay. Thank you, Heather.

Good afternoon everybody, Commissioners. Happy to be here moderating this panel. We have a lot of great speakers and a number of topics to touch on. So I will say very little and just try to, hopefully, help guide us through some of the topics. But the goal of this panel is really to provide a range of perspectives on economic prospects for business, but also provide a sense from a regional lens, as well.

So we've split the panel into two groups. And we'll start off taking a more statewide perspective. And then about 40, 45 minutes in, we will switch and get some more regional perspectives on the same set of questions. So we'll run through the questions and folks will jump in as they would like to answer, and maybe some will skip over some.

But on this first panel, we've got three great participants, Bob Raymer from the California Building Industry Association, Tiffany Roberts from the Western States Petroleum Association, and Michael Shaw from the California Manufacturers and Technology Association.

And so I guess we'll just start with the big-picture question for each of you, which is just to get your perspective on major trends that you expect to see in your industry, in your sector over the next ten years or so, you know, and how you see that playing out at a statewide scale? And also, you know, highlight if there are any regional issues that we should be focusing in on, on the next panel.

Do you want to start?

MR. RAYMER: I'll take it away. In terms of major trends that have kind of already started and going to increase in the coming years, for residential construction, we're definitely seeing high-density single-family home development sort of take off in a big way. And this is -- we're just going vertical. As long as the home has a residential fire sprinkler in it, they can be within six feet of each other. And sprinklers are required in California, so effectively, all single-family homes can do this, and they're doing it in a big way.

Consequently, over about the last 10 to 15 years, we're now looking at over 80 percent of the single-family homes that are built in California are two and three stories tall. And when it comes to infill, another major trend, and this is a very good thing, is we're seeing the first one to two floors are commercial. There's a ton of mixed use going in. There's a lot of it right here in Sacramento as you're coming into town over there on the 20th Street exit. And effectively, the first two floors will be commercial. You usually have anywhere from three to five floors above that. That's a relatively easy construction to do.

Also, in terms of parking, we're seeing limited onsite parking, and in some cases none, where basically you're sort of left to deal with the parking. And that's not a problem for the millennials. And quite frankly, that's a major target for these urbanized areas.

In terms of energy, new residential is gearing up for either the onsite or offsite renewable energy components. It's beginning to look like the community solar approach may become the compliance method of choice down the roads. There's still a few hiccups that we need to address in the IOU areas; we're identifying that. But quite frankly, having a community solar, an offsite solar facility, either within the same climate zone or, who knows, 100 miles away, like SMUD is considering, it's a very inexpensive way, a lot cheaper than simply doing very small, individualized renewable generation onsite home after home after home. And so we're looking at a variety of these approaches, but it looks like that will be the method of choice down the road.

And a lot of jurisdictions, of course, are beginning to look at promoting all-electric construction which needs to be done with a lot of care and coordination.

And so that sort of concludes my comments on this one.

MS. ROBERTS: Good afternoon, Commissioners. My name is Tiffany Roberts and I'm with Western States Petroleum Association and thank you for the opportunity to be here with you today.

Just to note, also, we'll follow up this conversation that we have today with some written comments so that we make sure that we've captured what we've provided here and maybe a little bit more, as well.

So in terms of trends over the next decade, I think really what we look at first and foremost is the fuel consumption that is currently taking place in the state of California. As we know, compared to the rest of the nation, California is a big fuel consumer and will continue to be a big fuel consumer. And so I think it's important to acknowledge that. USEIA also acknowledges that even by 2040 the nation's energy profile is still going to be made up of roughly 80 percent fossil fuels.

And so as we look to put additional regulations in place, especially when we think about climate change policies, how do we put those policies in place such that we don't create distortions in the market? That's one of the things that we at Western State Petroleum Association actively engaged in, in looking at ways to make sure that we can continue to inform policies in a way that provides some economic balance, along with balancing the environmental outcomes that we'd like to achieve.

Another point to make, too, is that I think you were all aware, we were actively engaged in part of the cap and trade discussions back in 2017. I think you'll start to see more and more of that as other states consider climate policy, as well.

So I think the takeaway that I would encourage you to have, specifically from this first question today, is that we are actively engaged in that space. We want to be part of the conversation and we want to help find good public policy solutions.

MR. SHAW: Thank you, Commissioners. Michael Shaw, California Manufacturers and Technology Association. I, as well, appreciate the opportunity to be here today.

I think it's important to note where we

are in terms of the cost of electricity and natural gas. And you know, not to be a downer here, but industry -- industrial customers on the electric side are paying about 102 percent above the national average for electricity costs. Obviously, that varies to some degree across the state. But it's important to note that because when it comes to investment decisions, companies are looking at those types of costs on a per-unit production basis to help make decisions about where they make future investments in the state. And obviously, that has implications in terms of job creation, state tax revenue, and a host of other issues, as well. On the natural gas side, we're about 92 percent above the national average in natural gas prices.

So those are a couple of issues that companies do consider. And it is important because natural gas and electricity both play important roles in manufacturing processes. We see, for the foreseeable future, a significant role of natural gas, as well. There are many applications where electricity isn't the most efficient method of heating or otherwise, you know, treating in some way materials for production. So that is an issue that we're very sensitive to, as well.

As electrification pushes forward on a number of fronts, primarily on the residential side, you know, there are some potential concerns or issues that the Commission, as well as our elected leaders, you know, should be considering, and that is the fact that the fewer customers there are, the higher the transportation costs ultimately end up being as a share of the price of natural gas in that case. So those are -- that is an implication that we're also very sensitive to because there are some, again, applications that just don't work on the electric in the manufacturing side.

Now we do see companies continually pushing to identify ways that they can within, you know, capital expenditures, capital expenditures budgets, push for more efficient operations, so that will continue to be an issue. The impact to impact to the Cap and Trade Program also plays a role in this, as Ms. Roberts mentioned a moment ago, in that, you know, those costs do transfer either directly through the emissions of the process of the manufacturing facility or indirectly through the price of electricity and natural gas. So there's different paths to hit -- not hit, excuse me. There are different paths for those costs to pass on to manufacturers in one way or the other. So those are a couple of issues there.

We do also want to keep in mind that California is well into an economic -- a growth of economic -- a period of economic growth that our former governor now, Governor Brown, had reminded us repeatedly would not last forever. That is something that we should be mindful of, as well, because with those, with that contraction potentially that might occur in the future, that will significantly impact these efforts or could significantly impact the efforts to capital investments that would promote greater, more efficient operations at manufacturing facilities, as well.

So if you have revenue coming down, you know, in terms of economic impacts, and costs going up, it's a pretty bad path for future investments in the state. So when considering the future, we would hope that those considerations would factor into the decisions.

I appreciate the time and look forward to the rest of our discussion this morning -- this afternoon, excuse me.

MS. BEDSWORTH: Great. Well, thank you all. That was really helpful to hear. And I think based on, you know, the things you all touched on, I think it would be helpful to dive in a little bit more on the regulatory and policy environment, renewables was raised, cap and trade. But I think if we start at a big picture, thinking about how California's environmental regulations can help to advance the state's economy, and in your business sector in particular, and then if I think there are particular changes or updates that could help in your sector?

MR. RAYMER: Thank you. Well, I'll go ahead and kick that off. Bob Raymer, once again, with CBIA.

In terms of the residential sector, some of you may be aware that we're about to have a solar mandate come 2020. All new homes are going to have to have a renewable component in addition to the energy efficiency component that we've been updating every three years, and that's going to be a challenge. Most of our major builders in California are at least familiar with solar. Some of them have been putting it on as a standard feature for quite some time. But we still have a lot of the smaller and medium-size builders that need to get familiar with that. We're working with the CEC, CALBO, the California Building Officials, and a number of other entities to get the word out, and it's going quite well so far.

We also have three major policy drivers that are taking place sort of simultaneously. Of course, as I just mentioned, we're going to have a lot of renewable energy going out into the grid, you know, between ten o'clock in the morning and three o'clock in the afternoon. There's also, of course, the ongoing effort to significantly increase EV charging, both at home and at the place of business. And lastly, all of this is sort of being exacerbated by the move towards electrification.

And it goes without saying, and this was picked up in an article by The Bee yesterday that pretty much took up a full page, and that is all of this needs to be worked out well with the state agencies and the interested parties to make sure that we don't accidentally start having grid reliability issues, and that's a significant concern. The good point here, last year, AB 3232 got passed. The CEC, of course, will be looking into this. But it all comes at a time when we're about to head into time-of-day or time-of-use rates.

So the question is: As we're working on that, what's going to happen when people, in the summer of 2019 and in the summer of 2020, start getting those bills, particularly in the older homes, homes built in the 1960s and 1970s and, quite frankly, in the '80s too? They're significantly inefficient homes. And unfortunately in the PG&E area a lot of them are all electric and it was done all electric when homes weren't being built very efficiently.

And so all of this is sort of going to all kind of come together at once. And hopefully working and playing well together, we'll be able to get it right. So far I'm very optimistic about that. We have a great relationship with the Energy Commission. Looking forward to it.

MS. ROBERTS: On the regulatory front, I

mentioned climate policy earlier. And I think we'll probably continue that theme, as well. Like I mentioned, we've done a significant amount of work on the Cap and Trade Program. And as you know, the Air Resources Board just completed its rulemaking package on 398 implementation. I think by and large, there were some really good things as part of that package. Obviously, there were some things that we thought could have been worked more, and maybe from a cost containment perspective, really could have had a few better outcomes.

But that said, I think the overarching message that is important from an energy perspective is that when we think about climate policy and the role that it plays, the impacts that it has on energy in the state, availability, reliability and affordability, what we want to be cognizant of is that there are interactions between various climate programs. The Cap and Trade Program and the Low Carbon Fuel Standard, for example, are two that we've been very focused on. So number one, that's an important interaction to understand.

I do also want to highlight for you that the Air Resources Board went through a big rulemaking package on the Low Carbon Fuel Standard. We were very active in that space. And there were actually some things that, believe or not, we appreciated as part of that rulemaking package. I think whenever I said that to Sam Wade a few months because in a public setting, everybody laughed because it wasn't something that really folks were expecting to her. But there were pieces of the Low Carbon Fuel Standard rulemaking package that we particularly thought were very good.

The Refinery Investment Credit Program is a really good aspect of that rulemaking package. We want to continue to work there to make sure that those opportunities continue to become available, and we will do that. I think we do have that good standing relationship to be able to continue those conversations.

Secondly, and I think what's interesting from the CEC's perspective, is the focus on carbon capture and sequestration and the opportunity that it provides, not only today but long term. There are CCS protocols as part of the LCFS. We think that there are aspects of that protocol that need some tweaks but overall we're very excited to see that in there. And we'd love to continue to have the conversation with you all, as well, to see if there are additional opportunities that we can open up around CCS.

MR. SHAW: And I think Ms. Roberts captured a number of the thoughts there. But we also have, I mean, obviously, the implementation of SB 100 and, you know, in various settings is going to be something that will be, you know, important, you know, how the -- how energy plays out in the state of California. The expectation that will hit, you know, the targets along the way is something we're very interested in, as well. Some of the flexibility that may or may not exist within that program as it relates to the types of energies that can fit into that last 40 percent, or the back 40, as you might say. So those are a couple of things.

Cap and trade, as Ms. Roberts mentioned, is also a significant component of things that we're looking at going forward and how that plays into California manufacturers and the costs that we have for compliance.

You know, the options that exist for reducing, you know, carbon in the atmosphere are something that we're also very interested in. Flexibility in making investments in offset protocols or other things of that nature are also very important to add to the carbon capture and sequestration on that side of the equation. And that's important because the opportunities that exist outside -- inside California and outside California are important to the global picture, and really, that's we're talking about is the global problem. I mean, we could literally shut down every industry, get rid of all the people and the animals and everything like that, and we're not going to have a significant impact on our own. It's only through our leadership and investment in other parts of the world, really, in addition to California that we're going to have that significant impact.

So you know, you hear a different tone from industry. Obviously, you know, we have also the requirement, really, of living under the mandates that currently exist and figuring out how to continue to be successful in that environment. So we are attempting to look creatively at ways that we can meet those obligations, as well as continue to make investments in the state. But those were a couple of the items I think I'd like to highlight, in addition to the ones that were mentioned previously.

MS. BEDSWORTH: Great. Thank you. I think as we look at the changes and evolution of the energy sector, another really important piece, of course, are the state's energy efficiency policies. I wonder if you all could speak to how -- have energy efficiency policies had a meaningful impact on your business sector? And are there specific programs or elements of the energy efficiency efforts that you'd like to highlight?

MR. RAYMER: Yeah. That's near and dear to my heart. It's been kind of a central focus of my job going back to 1981. So, yes, the energy efficiency standards have had a big impact on our industry but you've been able to show enormous efficiency and conservation savings for the state of California. And that, quite frankly, has proven quite well.

You'll notice, and again, whether or not you have a copyright in this or not is a sad thing, but at the national level so often what goes on at the national code level is simply mirroring a lot of what you've already done here in California. And so having my foot in both of those national and state arenas, this has definitely proven very beneficial.

Looking to the future, one of the issues, quite frankly, the CEC is already working on is making sure that the requirements for the residential HVAC changeouts in existing homes are followed. And once again, as we're going to time-of-use rates and you're in a home that was built in the '70s or '80s, the last thing you want to do is put a nice 14 or 15 SEER air conditioner in your home and attach it to a duct system that has a 50 percent leakage rate.

And the California Building Officials, as you are probably aware, were looking at, in the L.A. area, approximately 10,000 HVAC units that were sold for residential units with only about 500 permits being pulled. That's a five percent compliance rate. We're assuming that those that did pull the permit complied with the CEC requirement to check the duct system and make sure that there wasn't leakage.

But I can tell you from personal experience, we had a 2004 home. We put a brand new air conditioner, this year, onto it. My summer bill has dropped by $200. It was amazing. And so imagine what kind of an impact that's going to have during time-of-use rates in PG&E and Edison territory? It's fantastic.

Fortunately, with SB 1414, we're already working with the Energy Commission to figure out an unobtrusive way to try to get the product suppliers linked up with the building officials and make sure that the unit that gets sold here and gets installed over there is done properly and in compliance with the state law. So that will be a big thing that we're working on with the CEC, but the work has already started.

MS. ROBERTS: I'm actually going to defer to my colleague from CMTA on the energy efficiency part. I just feel like you probably have a bit more space.

MR. SHAW: I appreciate that. You know, so it's interesting thinking about this question in particular. You know, manufacturers are on both sides of this equation, we're both consumers of, you know, machines and other process -- other important pieces of technology in the production process, but we're also manufacturers of the products that then are sold to consumers.

So we both deal with the energy efficiency question on the front end in terms of what we do and how we do it, and then on the back end in terms of selling it to others who then, you know, have to purchase products that meet certain qualifications of otherwise incentivize to purchase, you know, projects that meet, you know, such as an HVAC system or a television of a refrigerator, you know, of that nature. So those are important, you know, concerns for us.

Really, on the front end of it we have, obviously, the cost of those installations and the capital expenditure because typically, in the case of a manufacturer, you're purchasing something with the expectation that you'll have many years or at least some number of years of use of that particular machine, computer, other piece of technology in the manufacturing process. On the other hand, on the production side, you know, meeting some of those efficiency challenges in the products that we sell to consumers is also an issue that pushes companies to be more creative and pursue new technologies to invest a good amount of money in research and development. So it is both -- challenges on both sides of that equation.

I think energy efficiency programs, you know, that exist today, you know, have benefitted, in some cases, manufacturers and also, you know, been a challenge for them to meet. So you know, as you go forward in pursuing new programs on the energy efficiency side, I know that you keep these things in mind. I know that, you know, Commissioner McAllister, in particular, you know, we've talked in the past about energy efficiency, you know, as an issue that is important to manufacturers. And you know, we do, you know, whether it's computers and, you know, Intel and other companies that are producing those products or manufacturers on the other side who are making, you know, airplane components or petroleum products even, you know, these are -- we appreciate the opportunity to be a part of those discussions, so --

MS. BEDSWORTH: Great. Thank you, all.

So now that we've talked a little bit

about the regulatory and the policy environment, I know there were a couple of questions sort of looking ahead in the future.

And so just to start, I guess a question around areas you see for new for new investment in your sector. Sort of are there new activities or new investments that you're anticipating?

MR. RAYMER: Oh, big time. For residential, energy storage is going to be huge in the coming years. And I'm thinking back now. Initially, when we were working with the Commission on getting the Battery Compliance Credit for the next set of standards, we were just -- we're always looking for innovative ways to leave a lot of freedom to the builder to get to the end goal but figure out how to do it. But in addition to helping meet the total renewable goal, I'm thinking this is a two-fer. Where putting that onsite battery is not only going to kind of be a hedge against the time-of-use rates, you're going to be able to keep the cheap solar power onsite. But the fact of the matter is it's really going to help the utilities and the state with grid harmonization, no question about it.

And we already have major builders who

are already experiencing problems getting their hands on this, which is a great thing. They're looking at early compliance with the 2020 regs and we're finding problems getting our hands on enough of the batteries for the long-term cells.

Other areas that we're seeing are onsite water recycling on a house-by-house basis. There's a lot of new and innovative technology there and it's getting cheaper.

Module construction is picking up again where significant components of a house are basically built in a factory. You have very little waste when you're doing it that way. It's trucked to site. The biggest issue that we're trying to get is how to get it from point A to point B, that's always been the case in the past.

And lastly, smart phone technology, being able to use this to control the security, the energy consumption of the house, turn off the lights in the bedroom, it's working great. But we've got to be able to teach people, including myself, how to use it properly.

MS. ROBERTS: I think in terms of investment, one of the things that we would want to highlight is the investment that's already taken place, specifically on the upstream side when we think about production. And we don't want folks to forget the fact that the investment made in new ways to produce oil and natural gas actually resulted in a natural gas renaissance in this country.

I think the reason that's important, especially for California, is the fact that when you look nationwide, not only nationwide but worldwide, at emissions profiles of the U.S. relative to other countries, what we see is because of that renaissance in natural gas production, we've had fuel switching back east. And that has allowed for us to reduce greenhouse gas emissions across the country.

I think that's a very important thing to note because as we continue to be concerned about greenhouse gas emissions and finding innovative ways to reduce them, we don't want to forego the opportunity in the oil and natural gas sector to reduce those and recognize the contribution that's being made there.

I would say, also, on the refining side, as well, we don't want to forego opportunities to do refinery investments such that we would have additional energy savings. I know sometimes the permitting process can get -- maybe hamper that ability. And so I think just being cognizant of the fact that there are potential opportunities but at the same time that, sometimes due to CEQA permitting issues, we may run into potential problems there. And trying to sort through what those problems are and finding a workable solution is going to be important.

MR. SHAW: Very good question on future investments. I think, as I noted earlier, I mean, capital expenditure budgets are limited. And you know, for a variety of reasons, California is a challenging place to make those investments for some companies, for many companies, I should say. So that is not an impossibility but it is something that is difficult.

Future investments, I mean, you know, California manufacturers and, really, manufacturers worldwide are continually looking for ways to improve their processes and be more efficient. Energy, you know, either as natural gas or electricity is an input in these processes. And so they want to find ways to use less. It's in their best interest. In many cases, it is a larger expenditure for manufacturers than labor or other cost categories would be. So they are looking to make those investments.

But they also need to know that there's a payout in the end. They need to know that it's going to save them more than it's going to cost them to make some investments, and it needs to happen in, you know, a relatively short period of time, on the magnitude of several years versus 15, 20 years, which that would never pencil out, really, in a manufacturing context for a capital investment of the nature.

So I would encourage you, as you're looking at future efforts, to incentivize, you know, energy efficiency. The short timeframes are important on the return on investment. And I'm sure, you know, you well know that. But it is something that's increasingly challenging. And the outside factors out of your control, you know, do impact those decisions, as well. And that's, unfortunately, something that you can't influence, even if you're pushing for that, is the tax and other regulatory environment and labor environment in California, the availability of skilled workers to meet, you know, the demands of an increasingly technological manufacturing sector, both in terms of what we produce, but also how we produce it. So those factors are something to keep in mind.

But on that last point, actually, a moment of inspiration here perhaps, but something for you also to look at is the skilled workforce because we do have increasingly, you know, technologically advanced manufacturing processes taking place, producing even some of the simple things that we used to do manually or by hand in the past, we will need people to do that. And I do believe that it's appropriate, you know, for the Energy Commission here to consider those as those programs go forward because we will need to train those workers to fill those roles. Otherwise, we can buy the nice, expensive, super energy efficient machine and, you know, we've got a really expensive and very large paperweight.

MS. BEDSWORTH: Great. Thanks. So I know we're trying to get through a lot in a quick period of time.

But building on that, I guess, I'd ask if there are significant uncertainties facing your sector?

MR. RAYMER: Yes. Yes, there are. And I don't mean to be Bobby Bummer here, but we've got some challenges right now.

You know, if you go back a couple of years, there was already a national labor shortage. California was sort of ground zero for that, as well. Now keep in mind what's happened over the last 18 months with the Napa fires and the Paradise fires. We lost, in 18 months, over 20,000 dwellings, homes and apartments, and these need to be rebuilt.

And the question arises, in order to be able to go forward and fix that, you need -- the builder needs to be able to get a commitment on labor, a commitment on materials at a given price, and the people who need to rebuild need a commitment from the insurance company of what exactly, what is that number that they're going to be given? And to this day there is still a significant amount of debate going back between insurance companies and the Napa fire victims as to what that amount is, and it's going to be even worse with paradise. So this is a huge problem.

And as I mentioned, one of the other commitments we need is will we be able to get that wood or that solar for a particular price a year, a year-and-a-half down the road? We don't make the product purchase agreements tomorrow for a home that we're going to build next week. We try to get all of this stuff planned ahead a year, year-and-a-half ahead, and that's where the tariffs come in.

And a problem with the tariffs is that -- is twofold. Eventually, you will see a price increase down the road. But I think the more immediate impact is the uncertainty, that once somebody says, oh, I want a tariff on solar, I want to put a tariff on wood from Canada, all of a sudden the product suppliers, you've got the manufacturers of a product, you've got the supplier chain, and you've got the end result where it gets used, and in the supply chain, they don't want to make commitments to get us wood at a certain price, solar at a certain price, if up here they don't know what it's going to be. And so let alone whether the trade wars are going to have any positive impact down the road, it's having a very negative impact on the front end because of the uncertainty that pops up here.

Lastly and something that wasn't discussed this morning, with residential construction, whether it's apartments or single-family homes, as we're building out we need to plan ahead and we need finished lots. And that's where you've gone in, the land gets developed, streets are being put in, utility line extensions are being put in, and that's where major developers are basically selling off major parcel lottage (phonetic), you know, 500, 1,000 lots over here that a builder can come in and then construct the homes or whatever. The availability of finished lots in California has dropped through the floor. And it takes years and years, and I'm saying decades, to get a major product off and running.

Newhall Ranch, a very sort of in the news these days project in Southern California. Ultimately, it's going to have 23,000 single-family and multifamily dwellings, a lot of mixed use, et cetera. It took them 30 years. I had brown hair when they started that, so -- and the same goes for, you know, Tejon Ranch which is just now getting approval.

When you have to spend decades moving this forward, this creates a snowball effect. And so we've got some serious challenges that we're going to have to be working on in the coming years. The good news here is Governor Newsom seems to be more than up for the challenge and has a very robust goal that he wants us to seek out there, and so we'll be working with him to try to affect that.

MS. ROBERTS: I think there's probably a lot we could say in this space but I am going to try to keep it brief.

On the regulatory side, I think there's always going to be considerations around cost. How do we make sure that we contain cost on the carbon side as we continue to see either additional regulations added on to the current scope of regulations or we see those regulations that are currently in place start to tighten? So how does the state ensure adequate cost containment?

Specifically for us, I would look to the low-carbon fuel standard questions around feasibility and what that means in terms of being able to essentially provide fuel to the state in a way that doesn't essentially disrupt consumers' ability to ensure they've got cost-effective gasoline, if you will? So that is one issue.

I would say the other issue, too, and I would commend this body for having looked at this in the past, is the connection between the electricity sector and the transportation sector. I know a few years ago in the 2017 IEPR there were considerations around reliability and what that would mean on the transportation side if we do lose reliability. I would encourage this body to encourage to continue to think about that. To the extent that we have any type of electricity reliability concerns, that certainly impacts the state's ability to produce refined gasoline and diesel. And so continuing to keep an eye on that and really understand dynamics between the two sectors is very important.

MR. SHAW: Economic uncertainty, as well. Yeah, I think I mentioned earlier, you know, obviously the -- some point in the near -- relatively near future, it seems, you know, we can expect some kind of economic, you know, contractions of some kind. Obviously, I think as Mr. Raymer mentioned, you know, the international trade picture, you know, plays a role, as well, particularly in California where a great number of our products, you know, ultimately end up going overseas somewhere. You know, we are a significant exporter. We have, you know, the largest, well, two of the largest ports in the country, in particular, which is a great benefit to us, plus our agricultural products which, you know, in many cases go through some type of manufacturing, as well, you know, ultimately end up going to other parts of the country and the world.

So -- but the economic impacts and what's happening in Europe currently certainly is something that can play into that picture. What, you know, tensions with the other countries, China, Russian, et cetera might, you know, play a picture -- or would certainly impact that, as well.

But I think also, you know, in addition to that we have just the general regulatory environment in California that is, I'd say, disincentive in some cases for companies to make investments in California. And I don't necessarily say that because it is a costly place to comply with the regulation; that is part of it. But another large part of it when you talk about economic uncertainty, the regulatory uncertainty is also a big issue. Companies make investments, they expect, again, to have some period of payout on that investment, and California continues to push, you know, beyond where we are.

And that has created some uncertainty on the compliance side which then begs the question: How long is my investment going to be hanging out in the state versus how soon am I going to have to replace it because California changed the standard again? Again, that's not to say that California shouldn't be incentivizing, you know, those investments. But the mandatory compliance aspects of it do create some uncertainty, as well.

And so we've gone through this most recently with cap and trade and the impact that that has. You know, companies, you know, who were facing the prospect of significant reductions in the industry assistance or the allowances that are allocated to them to help them comply and mitigate the risk of leakage, you know, they, fortunately under the leadership of Governor Brown and the legislature and Ms. Nichols at the Air Board, Chairwoman Nichols, you know, do see the benefit of that, you know, at 100 percent for the remainder of the program as it's been authorized thus far.

So there are things that have -- there are uncertainties that exist. There, of course, are the things that we just can't imagine that will happen yet. But then there are things that we do have more control over. And I would just encourage you as you look at, again, you know, implementing various programs through the CEC or colleagues at the PUC and other regulatory agencies of various stripes would consider that, as well.

MS. BEDSWORTH: Before we, excuse me, wrap up this part of the panel, I wanted to make sure that --

CHAIR WEISENMILLER: Yeah.

MS. BEDSWORTH: -- we provided some time for the Commissioners to --

CHAIR WEISENMILLER: I wanted to go back to Rob's comment about hiccups in the community solar and give him a chance to explain that.

MR. RAYMER: Sure. Excuse me. As we're implementing something like that, this is a quantum leap in building codes. You don't normally see such a major change happen relatively quickly. And I know that we've been working on this for a decade. But the fact here, the effective date is right around the corner.

And number one, the smaller and medium-sized builders that are out there, they have to be able to -- if they're not going to do a community solar project, hopefully through the utility, they're going to have to be able to get their hands on the material. So in essence, if they don't already have an established relationship with a solar company, they need to get one. They need to get one last week.

They also have to be able to start working on product purchase agreements for homes that they've got in the pipeline. And with that, they need to be able to get that commitment of what that solar is going to cost. You're hoping to get it to where you can ultimately sell it to the homebuyer for about $2,500 to $3,000 a kilowatt. Thanks to tariffs, all of this is kind of up in the air. And who's to say that, you know, a large builder will come in and get a huge amount of product, where does that leave the small and medium sized?

And so once again, there needs to be a general understanding within the regulatory arena that us out in the private sector are about to take an enormous step very quickly. And I think there's an understanding of that, particularly with Commissioner Hochschild and Commissioner McAllister, that as we go about developing the next set of standards, you going to be giving a breather onto new residential as you focus on the existing housing stock and commercial and whatnot, and that's well deserved because we're going to be busy.

And we need to get this right because, quite frankly, you've got 49 other states that are looking at us. Some would love to see us fail. Others want to see, well, what did happen there that we want to make sure we don't do? And the important thing is let's just get it right so those that want to be detract don't have anything to say and those that are looking for a way to do it can say, well, let's do it like California did.

So it's tough. We're going to do it.

CHAIR WEISENMILLER: And, Tiffany, I just wanted to ask in terms of assuming we meet Governor Brown's targets for zero-emission vehicles, what does that do to the refining industry in California?

MS. ROBERTS: I mean, I think it's a great question. And I would also look at some of the forecasts around zero-emission vehicle penetration, as well. I do think that, frankly, the state has a tough hill to climb when it comes to meeting some of those targets.

That said, we also have to look at the signals that it sends the market, both in terms of investment, short term, as well as investment, long term, and be cognizant of that. How much of a market are you going to have here in California? Certainly, we believe that there will continue to be a market.

I think again, I mean, I mentioned early in my statement that California is one of the largest fuel-consuming states and entities on the planet, so there will continue to be a market. I think what we have to be cognizant of is what's the marginal impact associated with additional zero-emission vehicle penetration and the signals that it sends to individual companies and investors? I can't speak to any one company's potential for making investments in the future. But I can tell you that people are concerned about what that means for the future.

COMMISSIONER HOCHSCHILD: Can I just follow up with you? I'm just curious if you have an assessment, I mean, with takeover for zero-emission vehicles is 5 million by 2030. And as you know, we were selling 6,000 a month in California a year ago. We're now to 25,000 a month. Is the -- do you have a projection of what you think is more realistic in terms of where it could go?

MS. ROBERTS: That's a very good question. And certainly I think, you know, there are individual companies who could be potentially looking at that. We have not looked at that analysis yet. I think we've just looked at the forecast relative to what we've seen actually come to pass. And we do have some questions about the potential to realize those numbers.

I'd be happy to talk further with you offline to think about what that analysis could look like because I do think it's an important question.

COMMISSIONER HOCHSCHILD: Thank you.

COMMISSIONER MCALLISTER: Michael, I wanted to ask you a question. So I think, you know, I agree with you that the program environment has been kind of a little bit underbaked for, you know, industrial. We've been working on ag and sort of, you know, SB 350 does require us to work with -- to find solutions in the industrial sector, as well. You know, it's one of the key sectors for emissions reduction.

I'm wondering if you have any sense yet of what implementation of the Hertzberg bill from last year, 1131, might result in for you and your members, or just more broadly, you know, think about solutions? What would a programmatic structure look like that would get at -- would incentivize, you know, the right moves, relevant moves effectively, you know, in a relevant way that didn't get in your way?

MR. SHAW: That's an excellent question. You know, Senator Herztberg got a couple of bills. Sorry, it took me a moment to sort out the numbers there.

COMMISSIONER MCALLISTER: No. Sorry. This is the one that includes industrial explicitly in the program environment.

MR. SHAW: Yeah. No. No. And I appreciate you stringing the question out there a little bit to give my moment to catch up and refresh there.

No, it's important, you know, to make sure that we have programs in place for the industrial sectors. You know, I mean, it is, I mean, one of the largest, you know, users, some of the largest users of electricity. I'd say the largest users of electricity are certainly, you know, in that -- in our sector, so finding ways to incentivize that is important. And giving them access to some of those energy efficiency dollars is critical to do that.

You know, anything that can be done to help defer on some level or reduce the costs of making those investments is -- you know, really gets down to that issue of the return on investment and the bottom line, and the capital expenditure budgets are limited. So you know, that program, you know, will help, we believe, and that's why we supported, you know, that particular piece of legislation to help get there.

Looking at potentially cross, I don't want to say pollination is not the right word, but just cross benefits, really, between programs, there may be something that we could look at. I know that there's been discussion of different programs, LCFS and Cap and Trade and, you know, different things in the past. I'm not necessarily suggesting that that's one to pursue. But if there's a way to find, you know, between programs, some benefits, if you do something here you get a benefit over there, as well, that might be an opportunity for us to pursue.

But ultimately it comes down to that bottom line and what is going to help reduce the cost of making that investment or finding some way for that investment to pay out in other scenarios, so again, if there's that cross benefit between programs, you know, something along those lines.

That also has the side benefit, I think, of making compliance a little bit easier in some places. Where this is more cost-effective compliance on one side, you know, maybe that's the place where you put the -- make your investments versus another area, too.

So there's a couple of different opportunities I think we could pursue in that context.

CHAIR WEISENMILLER: So one last question for Tiffany.

You had mentioned originally the relationship between LCFS and carbon capture and storage. Do you have specific ways to state to help move that forward, other than the LCFS regs?

MS. ROBERTS: Yeah. I mean, I think the LCFS reg is the natural place to start because they've already included a protocol in that rulemaking package. I would say we should be having more conversation around what those opportunities look like. I can tell you that our industry is very excited about CCS, the prospect of CCS long term. And I think that's a very good conversation to start having. What do those additional opportunities look like, especially in the, you know, the 2040s, 2050s, that type of time span?

In terms of specific projects, certainly wouldn't be able to comment today about any type of specific project. But I think what's most important is to note that that is an area that we continue to watch and continue to believe that there's an opportunity there, for sure.

CHAIR WEISENMILLER: No, well, good. Because obviously, there's quite a lot of interest in reducing carbon intensity of the enhanced oil production.

MR. SHAW: If I could -- I apologize, Commissioner McAllister. I did want to add one note to your -- my answer to your prior question.

The issue that we face going into making use of those industrial energy efficiency dollars, you know, as you well know, dealt a lot with the standards against which we -- or the metrics against which we were based. So the benefit, you know, we hope to see come out of 1131 is that there will be a more defined standard and not a moving target. And that was the challenge that we faced under the prior program. So we hope that that will, you know, that that will be clear, you know, to the companies.

And I think the clarity is very critical in making sure that they have the confidence in making the investment of going through the process of applying for those funds and getting the certifications, et cetera, that go along with that.

So we'd appreciate, you know, your leadership in that area, as well.

MS. BEDSWORTH: Well, thank you, all, very much. I appreciate that.

MS. RAITT: Okay. Thank you. So this is Heather Raitt. And we'll shift to the regional perspective. So the panelists can come up to the tables and we'll have a place for you.

And, Jeff, can you hear me?

COMMISSIONER SCOTT: Heather?

MS. RAITT: Yeah?

COMMISSIONER SCOTT: Before you get going, this is Commissioner Scott --

MS. RAITT: Okay.

COMMISSIONER SCOTT: -- I don't know if we wanted to see if there were any questions for Part A of this Panel 2 here? Sorry.

MS. RAITT: So I don't know if folks in the room had questions of Part A of the panel?

COMMISSIONER SCOTT: Okay. It doesn't look like it. Thanks.

MS. RAITT: Okay.

COMMISSIONER SCOTT: Thanks.

MS. RAITT: So I believe that we're ready to go on?

MS. BEDSWORTH: Move ahead? Okay.

MS. RAITT: Go ahead.

MS. BEDSWORTH: All right. So we'll move into the second part of the panel, providing more of a regional perspective. And I believe we have Jeff Bellisario from the Bay Area Council on WebEx. And then we're joined by John Cho from Southern California Association of Governments, Tracy Egoscue from the Port of Long Beach Commissioner, Cyndee Fang from San Diego Gas and Electric, Eduardo Martinez from Southern California Edison, Tim McRae from the Silicon Valley Leadership Group, and Karen Mills from the California Farm Bureau, so a nice range of regions to hear from.

And I know that some of you have topics you want to spend a little more time on than others, so we'll sort of, we'll go through a similar set of questions, starting again with hearing from each of you in your region and then also -- within your region and/or within the sector in which you work in your region, just get your point of view on major trends that you expect to see over the next ten years or so. And you know, and if there are unique situations or circumstances to be considered in your region, it would be helpful to highlight those and maybe go through that quickly, and then we can turn our attention to talking more about their regulation and policy environment.

And so maybe we'll just go right down starting here.

John?

MR. CHO: Good afternoon. My name is John Cho, a Senior Regional Planner at the Southern California Association of Governments. I'm pleased to be here and share what SCAG is doing.

SCAG, as an NPO, produce regional close focused. We expect to see in the next ten years slow economic growth, low fertility rate, and higher share of old population. In ten years, baby boomers will completely move into 65 years and older. And 65 percent of all population growth will be for the age of 65 and above. And we expect to see more out-migration. In 2006, 20 percent of the out-migrations noted that their reason for moving was housing related. After ten years, it increased to 37 percent. So with increasing housing costs, we expect to see the continuing migration.

And we also expect to see automation. McKinsey and Associates predict that in ten years about 23 percent of existing jobs can be automated. So some jobs can be declined, some jobs can increase, and some jobs that we don't know yet will be created. So we see that education and transition of educating the workforce to get the new jobs will be important.

MS. EGOSCUE: Thank you. Tracy Egoscue, Port of Long Beach. Good afternoon. Thank you so much of the invitation, both to the Chair, Members of the Commission, and also to the staff for this afternoon. I've been here all day and I am honored to be part of these expert panels, both this morning and this afternoon. I'm going to be very brief because we have such an esteemed panel that joins us.

But from the Port of Long Beach's perspective, our all-electrical terminal in Middle Harbor, which is entering into its third phase, uses approximately four times electricity as a normal terminal. So for us being moved towards electrification of terminals has increased the demand on the infrastructure. We are Edison's largest regional customer, and without innovative strategies and support, both from the state, including this Commission, thank you very much, and also CARB, and also our regional partners, we have quite a road ahead of us in the next ten years to meet our zero-emission -- near-zero-emission goals.

Thank you.

MS. FANG: Cyndee Fang from San Diego Gas and Electric. And thank you for the opportunity to participate in this workshop.

What I see are three big trends. First, obviously, the state policies to reduce GHG emissions, increase renewables, and the aspirational goal of getting to carbon-neutral. In addition, the growth and expansion of CCAs will dramatically change the relationship of the utility with our customers, as well as just the nature of the utilities themselves.

Also, as far as general trends that we see, what we see is over the last couple of years, and we expect this to continue, declining use per customer. And this ends up being something that we see on the electric side, on the gas side, residential, nonresidential. And that does have significant implications, especially when we look at what this means to rates. So even with costs being flat, you know, when we've got declining use per customer, the rates are going to go up. And so this does have significant implication as far as, you know, being an important upward right pressure.

COMMISSIONER MCALLISTER: Do you mean declining sales for customers or --

MS. FANG: So we have declining use per customer. And our customer growth is slowing, so it does result in overall being a declining sales in general at the system level.

COMMISSIONER MCALLISTER: Okay.

MS. FANG: But the behind-the-scenes driver is how our customers are using energy.

COMMISSIONER MCALLISTER: Okay.

MR. MARTINEZ: Eduardo Martinez from Southern California Edison. I can actually echo a lot of the comments from Cyndee.

I want to reiterate a little bit some of the regional patterns that were identified this morning. We do see the So Cal economy reaching the mature phase of expansion. Job growth is still positive year-over-year, however, each month that year-over-year increase is continuing to decline again, showing evidence of a slowdown in that expansion, not quite a recession.

We're heavy users of the BIA data, the permit data. We actually have seen, when you take a look at just the service territory, when you take out LADWP, the City of Anaheim, City of Riverside, single-family has exceeded multifamily. So if you look inland, the inland parts of the Southern California service territory, that's still primarily single-family. There are parts, like Irvine, obviously, Tustin Ranch, where you have a lot of multifamily. But the service structure as a whole, you do see us reverting a little bit back to that long-term average.

Echoing on Cyndee's comments, especially with that average usage, so the megawatt hours divided by customers or square footage, that does produce a modeling challenge for us, and I'm sure it does for your modelers, as well, too. Because what we've seen the last few years, there's a decoupling from economic indicators. Traditionally, as an economy expands or it contracts with GDP output or employment output you see a good relationship with consumption of energy. Now, because of that decoupling, because of the efficiency gains, DR penetration, we're seeing less of that, so that does create a little bit more of a modeling challenge for us.

MS. MILLS: Good afternoon. Thank you for asking me to be here. Karen Norene Mills for the California Farm Bureau Federation. Just a minute about the Farm Bureau, the state's largest farm organization.

We work with our 53 county Farm Bureaus that are throughout the state, representing 56 counties throughout the state, so we really are a statewide organization. So agricultural regions and areas might have particular concerns that they face; there are a number of overarching impacts and trends that face everyone, every farm and ranch throughout the state.

Three key drivers for trends that we expect to see in the future are, of course, water availability and policy, labor availability and regulations and, of course, land use constraints and impacts from various policies. Overlaying those kinds of concerns are the fact that the demographics for farmers and ranchers throughout the state, and really throughout the country, are an aging ownership trend. And these are largely family farms, and over 90 percent of the farms and ranches in the state are family owned, family based. So it has -- the age demographic has an impact as we move forward throughout the years.

MR. MCRAE: Good afternoon. I'm Tim McRae with the Silicon Valley Leadership Group. And we do an annual assessment of the economy of Silicon Valley for our Competitiveness and Innovation Project, comparing Silicon Valley to other innovation regions around the U.S., like New York and Boston, Seattle and Austin, and Southern California.

The most recent data we have shows that 2010 to 2015, jobs increased 29 percent in Silicon Valley. The population increased eight percent. Housing stock increased four percent. So median home prices in Silicon Valley now top $1 million.

Silicon Valley average roundtrip commute times are now 72 minutes. So traffic and housing are the big issues that we work on. And we have led several transportation measures, like trying to fund BART to Silicon Valley, which will come, lots of Caltrans improvements. We (indiscernible) campaign for (indiscernible) statewide housing ballot measures, and we expect this to continue. There will be other things that I talk about that are impacting us from an energy and the economic competitiveness of tariffs and immigration policies. But we're growing and we expect to continue to grow.

MS. BEDSWORTH: Great. And then, Jeff Bellisario, can you hear us?

MR. BELLISARIO: Yes. I'm on the line. Can you hear me?

MS. BEDSWORTH: Yes. Great. Would you like to weigh in sort of around, you know, the trends in, from your perspective, in the Bay Area Region?

MR. BELLISARIO: Yeah. I'm with the Bay Area Council. We represent 325 business (indiscernible).

I think a couple of things that I'll mention.

One, as you mentioned before, housing affordability is key for us kind of driving slower population growth, driving longer commutes, kind of increasing the cost of doing business overall in the Bay Area.

And then two, we look a lot at the Northern California megaregion. We're seeing population growth in places like Tracy and Stockton, and even Sacramento to a very high degree, higher than in the nine-county Bay Area. But yet the majority of Northern California's job growth is still in places like San Jose, Silicon Valley, San Francisco.

So there's a growing disconnect between where the people are and where the population is growing fastest versus where jobs are growing fastest. So that's definitely a trend we'll be watching going forward.

MS. BEDSWORTH: Great. Thank you all.

So next we'll move to talk about more on the regulatory and policy environment, and I think we'll sort of combine the set of topics so that you can each talk about the piece that's most relevant, but just to give some perspective on how environmental regulations are playing out in your region, thinking specifically around renewables and energy efficiency, you know, things that are working, things that are not, you know, and just sort of give that perspective from where you sit.

We can go down the line again or we -- go ahead.

MR. CHO: Yeah.

MS. BEDSWORTH: We're going to start with (indiscernible).

MR. CHO: At an NPO perspective, we're kind of in charge of implementing SB 375 which reduce emissions from light- and medium-duty vehicles by integrating land use (phonetic) and transportation. And part of the plan is to encourage transit-oriented development and focusing development in high-quality transit areas. So through that, we can improve congestion which will enhance a region's competitiveness.

But the concern is that we see a declining trend in ridership, even though we introduce transit (indiscernible) development. And we also see displacement of low-income families, which is opposite of what we are trying to do.

So we see congestion pricing way of to reduce congestion and take people from driving to using transit. And also innovative funding strategy to build more affordable housing, such as tax increment financing, would be helpful.

Thank you.

MS. EGOSCUE: Tracy Egoscue, Port of Long Beach.

Most of you know that we have had a Clean Air Action Plan in partnership with our neighboring port since 2006. And it was something that the ports put together and committed to early on. And we've, I hate to say this, but we've picked a lot of the low-hanging fruit.

We have an international asset in the two largest ports of America, which means that we have international assets that visit us and we don't control their emissions.

So although we've seen great reductions in the sources of emissions that we've been able to encourage voluntary compliance, we are having a bit of a struggle with our greenhouse gas emissions. It's definitely going to be something that I am calling the final frontier. We're going to have to re-envision what it means to use fuel to move trade internationally.

Having said that, when we did our 2017 update to our Clean Air Action Plan, we modeled it after the Sustainable Freight Action Plan and we did that very closely, so that regulation helped us. It allowed us to say this is our barometer.

But I will say that we do need, and it would be helpful to understand, some more direction on that front. We can't regulate trucks; because it's across state lines, that's a national asset. We can't regulate ships. And unfortunately, those are our two largest sources of our greenhouse emissions.

On a final note, the international community has adopted a low-sulfur fuel standard which will come into place in 2020. That is all the talk. We just came back from Shanghai and all of the major shippers are talking about that, the impact that will have. It will mean more LNG, which we should notably talk about at some point, whether or not we actually have the fueling capability in our port complex.

Thank you.

MS. FANG: And focusing on GHG and renewable policies, I see three areas that we just want to make sure are being covered. So as we continue to progress with more renewables, you know, the biggest challenge is going to be how do you deal with the imbalances between supply and demand? So just to make sure that, you know, this creates a huge opportunity for storage to play a huge role in addressing and being able to avoid curtailments. And so just making sure the technology is really going to be there and ready to address the magnitude of this need I think is important. And to make sure that we also continue to explore other options, whether or not maybe hydrogen or other technologies might be able to also help sort of address that particular issue.

From the utilities' perspective, especially when we look at the electric utilities, you know, the biggest -- the gap is that with all of these policies the transformation of how we provide energy to our customers, the rate design is still archaic and still lags behind that. So the comments I made earlier about what happens as our customer use decreases, as our sales decline, and we continue to pursue those energy efficiency goals, the rates go up. And how do we start to managethat and how do we start to move that along into something that will be more sustainable as we continue to move forward with energy efficiency and as we expect to actually get to something closer to net zero?

In addition, the discussion this morning, the thing that I was struck by is the discussion about the commutes, about customers who work one place, live somewhere else, have this massive commute. And how do we start to really continue to move towards the governor's goals when we look at EV adoption? And so the charging infrastructure to really support that electrification is going to be critical.

MR. MARTINEZ: Ed Martinez from Southern California Edison. Again, similar to Cyndee's comments, I'm obviously supporting the state's initiatives on greenhouse gas reduction. I'm also supporting customer choice, especially in this age of CCA adoption. We're a little bit behind PG&E. The next few years, obviously, will be critical mass for us. We obviously want to work at the state level with our CCA partners, ensuring that's a success.

Going back to some of the comments from this morning, some of the risks that we wouldn't have imagined just a few years ago, especially when it comes to tariffs on the solar panels, and also with the EV adoption, one challenge for our modelers is just seeing where exactly are we on that adoption curve? Again, a few years ago we might have had a little bit -- we would have thought we were a little bit more further along with that adoption. Now as we get -- as the data comes in and these new risks emerge that weren't available, that we weren't available a few years ago, there's just some sort of adjustment to that. But that's obviously a short-term challenge for us.

MS. MILLS: So it's difficult to know where to start when you talk about environmental regulations with respect to agricultural. It's a resource-based business. They see it in every aspect of their business.

But maybe a place to start, of course, is with respect to water availability. And one of the bit issues, of course, that everyone throughout the state is looking at is a state Groundwater Management Act that will be on the path to being implemented as the agencies are being formed.

And one of the questions that I've pondered as it was enacted and then is being implemented is the interrelationship with energy use. Because as you all know, on-farm production agriculture, energy use is very closely tied to water movement throughout the state.

And so some of the policies that we see with respect to water use, and then with respect to energy use, in some ways conflict with one another with respect to time-of-use rates where it's -- where the mandate is incentivizing farmers to pump water and to use water at the end of the day -- in the middle of the day rather than at the end of the day as has existed because the water evapotranspiration, right, has increased when you use it during the middle of the day. So there will be, you know, there will be conflicts as it's implemented. And the implementation of it may prefer one aspect over another in terms of saving water usage as, perhaps, as opposed to energy usage.

There are a lot of opportunities for energy efficiency in the ag sector and a number of plans are in place. And people improve their processes on a continual basis, not necessarily using energy efficiency funds that are available and pass through the utilities and the Public Utilities Commission because sometimes those programs are so cumbersome and the checks and balances that have to be dealt with make it difficult for them to utilize them, and so they just do it on their own and --

COMMISSIONER HOCHSCHILD: Could you --

MS. MILLS: -- then take advantage of that.

COMMISSIONER HOCHSCHILD: -- could you say a little bit more about that? I mean, just looking at the opportunities for energy efficiency within the agriculture sector, what is the low hanging fruit, for lack of a better --

MS. MILLS: Well, unfortunately, the low hanging fruit has been used and dealt with over the years. And I think one of the problems with the way those programs are implemented is that once, you know, a few people have used them and seen that it works, it's assumed that everybody can do that and implement it on a cost-effective basis, which is not necessarily true. Keep in mind, farmers and ranchers, as I said, are family-based businesses. They make a strong practice of keeping their equipment and making use of it for a long period of time in order to be cost effective.

But there are real opportunities, and technology is helping with that. As you are well aware, a lot of nut producers in the state, and that's been increased in all those, you know, almonds, walnuts, pistachios, they all have to be dried and hulled. And there's a lot of opportunities in that area to reduce, for example, drying times and processing times, and that can be done with technology.

COMMISSIONER HOCHSCHILD: You know, one thing, I'm sure you're aware of it, but we could certainly use your help in getting the word out, we're launching, this month, Renewable Energy in Agriculture Program and grants in the quarter-million-dollar range for farms around the state. So we need all the help we can get in getting the word out on that.

MS. MILLS: Right. And I've been in contact with your staff people and have --

COMMISSIONER HOCHSCHILD: Good. Thank you.

MS. MILLS: -- sent it along to our internal publication to do that. And I would say that in working with the Energy Commission, I mean, you all have been very receptive to concerns about making it as easy as possible for the end producer to take advantage of it and figure out how to navigate that process for requesting grants and implementing those programs.

COMMISSIONER HOCHSCHILD: Okay. Well --

MS. MILLS: So we appreciate that.

COMMISSIONER HOCHSCHILD: -- thanks for your help with that.

CHAIR WEISENMILLER: You know, I was just going to ask you, in terms of getting feedback on our EPIC Program, that's obviously queued more to food processing.

MS. MILLS: So, you're right. And so Farm Bureau, obviously, you know, our focus is on production agriculture and, you know, a little bit aware of how the food processor sector works, so that's, you know, canners and processors --

CHAIR WEISENMILLER: Right.

MS. MILLS: -- are a little bit more focused. So they're much higher energy users, I believe, than production agriculture is in looking at efficiency efforts. And I know that you've done a lot of interesting things with respect to those types of programs. But I don't have a lot of knowledge in that area --

CHAIR WEISENMILLER: Okay. That's good.

MS. MILLS: -- Chair.

CHAIR WEISENMILLER: I just, I think both of us would happy to get feedback on how the programs are going.

MS. MILLS: Right.

CHAIR WEISENMILLER: Yeah. Well, actually, all of us would.

Tim, do you have something?

MR. MCRAE: Great. So Tim McRae with Silicon Valley Leadership Group.

On renewables, we have sort of a diverse membership. We both have folks who provide renewable energy and those who are end users of that renewable energy. And as such, it's a little bit of a complicated policy for us.

The Leadership Group did support SB 100 in its final form. But it’s worth noting that our position was to support if amended until the bill included language about safety, affordability and reliability. And this body, along with the other agencies, will have to contribute to a report every four years that evaluates of SB 100 on safety, affordability and reliability, and so we’ll plan to watch that closely.

It’s worth noting that environmental regulations often create opportunities for Silicon Valley businesses. I’ll cite two examples.

This Commission mandated, generally speaking, solar rooftops on new construction homes. And our solar members are looking forward to taking advantage of the growing market that that will create. And similarly, the Air Resources Board recently mandated that transit districts buy zero-emission buses. And not only do we have bus manufacturers that stand ready to meet that mandate, one of them actually moved its headquarters to California in anticipation that California would be the best market for its product.

MS. BEDSWORTH: Great. Thank you all. And then I will now -- oh, sorry, go to the phones.

Jeff, would you like to jump in on the question around regulation and how it's playing out in your region and any specific points around especially renewables policies and programs or energy efficiency policies and programs?

MR. BELLISARIO: (WebEx echo.) Yeah. I guess I'll echo what Tim said. I mean, communities, I think as earlier mentioned, there's a big opportunity around energy storage and electric vehicle charging infrastructure. I think you'll hear a lot about Google and companies in the Bay Area are already moving towards autonomous vehicles. Obviously, there's some overlap with EVs there. But I think that the nearer-term story and bigger story is more electric vehicle adoption and then charging infrastructure being built out in the region.

And maybe on a second note, I'll shift again to the megaregion. You know, when we poll our members here in the nine counties, you know, renewable policy, energy regulations generally fall pretty low on the list of their concerns. But when we start going out into the Central Valley in places where there's a bigger manufacturing footprint, maybe more logistics, maybe lower margin of businesses, those businesses tend to be very, very concerned about their energy costs. And we're continuing to kind of hear stories of businesses moving to Nevada or Oregon or Texas due to lower costs overall. And I think part of that is kind of the energy costs that go into that.

So as we're thinking about the Northern California megaregion and kind of growing the job footprint, we're attempting to move those manufacturing and logistics jobs into places like the Central Valley. But increasingly, other states are more competitive than we are here in California.

MS. BEDSWORTH: Then we'll move on, I think, then to the next set of questions, really sort of as we look ahead to the future. And I think I would ask each of you, and you've touched on this a bit, sort of what sort of trends are you anticipating within your sector or your region around new investments as you look forward and you're looking ahead?

MR. CHO: As an NPO, we do read housing development and transportation plans. And in L.A., we have a huge homeless population. And we are expecting to see more affordable housing for homeless population in L.A. And also, as online shopping grows we're expecting to see more real estate industry development in Inland Empire, which is a big driver of job creation in SCAG's region.

MS. EGOSCUE: This is Tracy Egoscue with the Port of Long Beach.

We are, actually, right now a hotbed of investment and technology. A lot of the zero-emission equipment doesn't exist currently and so we have a lot of investment, a lot of incentive programs to try and encourage the development. I would note that in terms of rebate programs, Edison, I'm talking to you, some of our highly specialized equipment doesn't entirely fit within the mold. So I would also encourage maybe an evaluation or examination, or maybe even an analysis of how to encourage rebates and incentivized action by our customers.

We have a bit of a yin and yang at the

port right now where we really want to advance our goals for clean air. As you all know, we're in a region of nonattainment. We have the highest asthma rates in Long Beach in the entire county. We are a responsible port. We want to make sure that we listen to our community and take care of our community, which we understand means lowering emissions. But right now, quite frankly, most of the technology doesn't quite exist. So calling all inventors, entrepreneurs, wherever you are, we are -- we have an open-door policy. I take meetings all the time. And I very much encourage the future in that regard.

Thank you.

COMMISSIONER SCOTT: This is Commissioner Scott. I just want to jump in.

The Port of Long Beach is one of five ports that have been working very closely with the Energy Commission in a collaborative over the last four years or so to look at some of the equipment and also some of the charging solutions. And so I would love to talk with you and Edison a little more offline to see if we can think about what projects in that space we might be able to work on to at least nudge some of this stuff forward a little bit. But we're always looking for great opportunities like that.

MS. EGOSCUE: I very much appreciate that, Commissioner. And I'm sure that we would come up to see you, Edison and the Port, with our staff; right? I'm not volunteering their resources. But we are -- we want to all work together and be sustainable together and successful together, so I appreciate that.

COMMISSIONER SCOTT: We're usually working with Heather Tomley on your team, so let's make sure we bring her in, as well.

MS. EGOSCUE: She's amazing.

COMMISSIONER SCOTT: She's great.

MS. EGOSCUE: Thank you.

COMMISSIONER MCALLISTER: I wanted to ask a question.

So you know, we've heard a number of folks, Farm Bureau and Long Beach and industrial sector a little while ago, I guess, about how difficult it is to participate in the portfolio programs or get, you know, rebates or, you know, get incentives to be able to change out equipment.

I was wondering if, you know,

representatives from SDG&E and Edison could sort of comment on the -- why those constraints exist, so of what the -- you know, help us unpack that problem? I know it's a fairly, you know, complicated problem. But if you could sort of help us -- help everyone understand sort of what -- why those constraints exist and sort of what some of the barriers are and maybe propose some solutions to helping get beyond them?

MR. MARTINEZ: I'm not the best person to answer that. But I will follow up with Catherine Hackney and our team up here, and also back down in Rosemead. I'll follow up on that.

CHAIR WEISENMILLER: Actually, I was looking for Heather, who just stepped around the corner, I assume.

But anyway, written comments will be due, so that might be something you could build into those.

MR. MARTINEZ: Yeah.

CHAIR WEISENMILLER: And she will remind us when they're due later.

UNIDENTIFIED FEMALE: Okay. Written comments are due on Thursday, January 31st.

CHAIR WEISENMILLER: Thank you.

MS. BEDSWORTH: Cyndee, did you want to pick up on sort of trends you're seeing for investments or, you know, areas of growth in your -- or SDG&E?

MS. FANG: So for SDG&E, we're always striving to be the cleanest, safest, most reliable utility, and so our investments sort of follow along those lines. And some of those, I've spoken to already as far as like how do we also strive to get to that cleanest aspiration while still being reliable and safe? So you know, electrification, infrastructure, renewables, energy storage, all of those are going to be top of mind.

MR. MARTINEZ: For Southern California Edison, ensuring reliability at the grid going into the future, especially with projects like the Clean Power and Electrification Pathway. And even in the IEPR process, this will be my third IEPR process, 2019, we've seen a focus from a macro systemwide down to the circuit level. And a lot of that circuit level focus is to ensure adoption of DRs on PV, EV, and even with energy storage. So that's obviously a big focus for us and will remain a focus for us going on into the future.

MS. MILLS: So I studied for this panel by going through our news publication that comes out each week, Ag Alert. And what might take away from reviewing it is a lot of the investments are driven by regulations.

One of the big investments that will be taking place in the San Joaquin Air District is new tractors because they're mandated because of the air quality constraints that, you know, 12,000 tractors have to be replaced by 2024. Now tractors and on-farm, in-the-field tractors probably aren't the ones that are viable for electrification. Some of the smaller, light-duty vehicles are and they've got programs, some experimental programs or pilot programs to do that. And those, apparently, are fully subscribed, so we're seeing investments in those areas.

As I mentioned before, automation, one of the constraints for automation and for technologies and communication is broadband throughout rural areas. And so it's served in some areas. There's even parts of the valley that have it available. It's not reliable and consistent enough to depend upon or it's oversubscribed. So it's an impediment throughout the state to new investments and advancements and things.

But you know, even with mandates and looking for, you know, farmers are amazingly creative and resilient and focus on new ideas. And for example, one of the new things that was addressed in one of the articles was someone was using drip tape for seed germination in row crops. So I think that people are constantly looking through -- looking for ways that improve their inputs and efficiency of their inputs, and that, of course, has an impact on energy. And I think they'll continue to change in the future.

MR. MCRAE: So I'll highlight two areas of federal government-driven uncertainty for Silicon Valley, tariffs and immigration.

We disagree with the president's approach on trade, and that's putting it mildly, which creates significant uncertainty for Silicon Valley businesses. For example, Apple has stated revised revenue productions and its recent decline in market value is directly attributable to the U.S.-China trade war and its intended tariffs. Early this year the Dow Jones Industrial Average dropped 2.8 percent, largely caused by that news. Other companies have also stated that the administration's trade policy is forcing them to consider the unpalatable option passing along the higher prices to consumers or absorbing the higher import costs by eating into their profit margins.

In the energy sphere, the tariffs announced last year on foreign-made solar panel manufacturing negatively impacted the solar sector both in terms of our solar companies, many of whom make their solar modules in other countries, and for end users who have to pay more for more of the solar panels that they.

And an immigration policy; immigration policy uncertainty definitely impacts Silicon Valley businesses who are eager to hire skilled workers. We're growing. We need lots of skilled workers. They come from all over. They come, some from the United States, but we also need them from outside the United States. We don't know if there will be the usual quota of H-1B skilled worker visas this year. And there's also uncertainty with regard to H-4 visas. And H-4 visas are for spouses and families of H-1 visa workers, which are also at risk. H-4 visas can be as important as H-1 visas for convincing top talent to come to Silicon Valley as two incomes are almost a necessity for owning a home in our high housing cost region.

MS. BEDSWORTH: All right. And, Jeff, do you want to weigh in on, you know, trends that you're anticipating around new investment or growing areas of investment?

MR. BELLISARIO: (WebEx echo.) Yeah. I think we're -- this is more of a hopeful area for us in the Bay Area. I think we're hopeful for discussions around housing design and alternative housing designs and building methods.

A couple things that the Bay Area Council has supported around mixed (indiscernible). They also tend to be smaller and more affordable. (Indiscernible) in San Francisco and (indiscernible) more units (indiscernible) multifamily dwelling.

Another thing that was mentioned in the previous panel, modular construction, I think that's a huge opportunity just to lower the building costs. It would help the entire state help fill that gap.

MS. BEDSWORTH: Thanks. And I know some of this just came up in the last -- in the answers to the last question but I'll just throw it out again, if folks have other or significant uncertainties that they see that could affect either the work that you're doing in your region or your region overall, if there are other items that haven't been touched on?

MS. EGOSCUE: I feel like I need to weigh in on the tariffs just because something has not been widely reported. But the Port of Long Beach broke our cargo record for last year because of the tariffs. There was a rush to avoid them. And our warehouses are full in the Inland Empire, as well. So we might see a slowdown in the new year, especially with the lunar new year. And we might see a bit of a correction. But I just wanted to let you all know that we broke over 8 million TEUs for the first time in the port's history in direct response to the tariffs. A bit of a twist of fate, of sorts.

MR. MARTINEZ: Southern California Edison.

I'd echo some of the comments, certainly, about housing, especially the lack of affordable supply in this state. That's obviously going to impact a lot of the goals that we have, especially for -- on the solar panels.

I did reach out to the California Association of Realtors yesterday, Oscar Wei. And he confirmed for me that what we're seeing in the Southern California region, at least, is continuing price increases, declining sales because of the lack of supply, and also that combination of interest rates.

I think the demographic panel did a really good job on talking about that more or less consistent outflow of a domestic net migration out of the state. So as the folks, especially millennials, hit their prime earning years, start earning families -- creating families, if they can't afford to buy a house and that housing market isn't responding to that demand, then that demand is going to filled in Arizona, Nevada, Texas, other states. That obviously will have an impact on our planning efforts from our end.

MS. MILLS: Well, so farming and ranching is, by its very nature, uncertain. Much as we crave predictability and certainty, it doesn't happen a lot because so much is driven by the weather.

But you know, that being said, some of the uncertainties that much of the state's agriculture is facing, one, of course, is with respect to water supplies. As I mentioned, that Groundwater Management Act, but also the higher flows requirement for the San Joaquin River has got people spinning a bit about what to expect in the near future.

I'd agree about the tariff situation. That has an impact, current impact, especially on high-value crops and on the prices of some of those crops. And there's a concern over losing market share. So it's not just an immediate impact, it's a future impact and, you know, how quickly the markets will come back after, you know, assuming that there -- this is especially true with China which is a big market, especially for a lot of the nut crops.

You know, there's other impacts, aside from the tariffs, as well, some of the food safety laws that the other countries are changing and putting in place. So the markets here have to adjust to that and predict, so there's always something changing and folks are having to adjust to. That's a constant process.

MS. BEDSWORTH: Any other uncertainties?

Jeff, I want to make sure, if you have an option -- opportunity.

MR. BELLISARIO: (WebEx echo.) I think right in the dimension of (indiscernible) energy consumption is related (indiscernible). Immigration, as I mentioned. The aging workforce, as I mentioned. It will be interesting to see if we can hit some of the kind of demographic projections given some of those headwinds, especially headwinds around affordability. We're definitely seeing more people moving out of the state than coming in. Our growth in the Bay Area is basically on international immigration. That kind of drives us. We could be talking about a different future in terms of growth trajectory for the Bay Area and for the entire state.

COMMISSIONER SCOTT: Louise, can I -- I'd love to jump in and ask a question. It goes back to the housing theme.

And, Bob Raymer, I might give you a

little heads-up. You brought the chart for us and mentioned it in the comments at the beginning that were at about 120,000 units built this year, and that you thought that that might be less for next year. But I don't think you had a chance to mention that. And just when I listened to Jeff's comments and Eduardo's comments and Tim's comments and others about housing, I'd love to, if you wouldn't mind giving us a few more details on that from earlier?

MR. RAYMER: Thank you for raising that. Bob Raymer with CBIA again.

And, indeed, hopefully those who are leaving will have a chance, I've left 50 or so copies of this chart out on the front desk as you get in. But as the Commissioner just mentioned, in 2018, we now have a pretty good firm understanding of what -- we always true these numbers up after the fact to make sure that the permits that got pulled got built and whatnot. We'll be just under 120,000 for this year. And you see the breakdown from the chart, that we're still a tiny bit higher up on multifamily versus single-family. So sort of the new normal is it's not one-third/two-thirds, it's basically kind of half and half now.

Having said that, what has happened in certain areas of the Bay Area, in Los Angeles and in San Diego, you've got pricing pressure that we've been hearing about all day, sort of, intermixed with the labor shortage. And without those finished lots to move onto, even slowly, we're seeing some major urban areas where -- and when I say urban area, I mean, you know, the buildout area, where the permits have dropped 50 percent, and that's stunning. That's not because of bad weather or whatever else. These were things that began happening back in August and September and during the fourth quarter really kind of blossomed.

And I can tell you right now, this -- well, not this time next year, but in October, November and December of 2019, you're going to see a whole bunch of permits getting pulled because state law says you comply with the building codes that are in effect. And there are always those that, well, I'd rather put that off. Well, you're going to see that again. But right now, I would guestimate that we'll probably be in 100,000 to 105,000. And we should be, you know, to get out of here, we should be moving up. We've plateaued at 65 percent of normal. That's the new normal.

And the problem here is that we're supposed to be building anywhere -- at a minimum of 180,000 units a year. We would suggest about 200 to 210. But at 180, the number of 8CD and LAOUs, that means we've got 1.2 million unit deficit just from this chunk that we didn't build here and add to that the 2 million unit deficit that we had going into this, that's why housing prices continue to skyrocket. And so we've got a problem here.

So thank you.

COMMISSIONER SCOTT: Thank you for providing that additional information. And just for folks in the room, they are out on the -- the chart is out on the table. And for folks who are listening on the WebEx, I imagine our delightful IEPR team will have that posted for you to be able to see.

MS. BEDSWORTH: Well, I think I'll put one more question out that shifts, maybe shifts us a little bit. We've heard a lot about work that's happening around renewables and efficiency. And another question we wanted to ask you all to think about was how your region and your sector of work is thinking about adapting to the impacts of climate change and what the challenges there will be?

MR. CHO: Yeah. In transportation system and infrastructure prospective, we're going to need to develop a resilient transportation system that can minimize the damage, and also minimize PG&E's disruptions in case of earthquake, fire or any kind of natural disasters.

And SCAG, as an NPO, is conducting research with our university. And also to educate our local jurisdictions, we have worked with Lewis Jones, Dr. Lewis Jones, to educate our planners and current jurisdictions. And then that's, I think, a part of planning for climate change.

Thanks.

MS. EGOSCUE: Thank you. Tracy Egoscue from the Port of Long Beach. I actually have a few points that I'm going to go very quickly, in the interest of time.

Obviously, I've already talked about the electrification. Just a little bit of a footnote there, we have to be mindful of what it means for our workers at the ports. That's definitely a byproduct of the climate change goals that we're seeing.

I've also had a lot of conversations with environmental leaders in the region who like the zero-emission goals, but they'd also like to see us have some kind of interim goal, as well. They're afraid that we'll spend so much time trying to get to this big goal far out that we're going to not do much in the interim. And they are really pushing us, and most of their very respected leaders are behind that.

Also, we've done a Climate Resiliency Plan for the port itself, the infrastructure. I can tell you that we're looking at needing to raise the breakwater. We're seeing much more intensive events. We've had some damage as a result of some of the storms. And we need to make sure that, obviously, these ships are safe coming into the facility.

And then last but not least but really important, we're looking at water reuse within the facility. We're actually encouraging. And we're doing a study right now about moving forward with recycling all of our water, not just our potable water use but also our stormwater within our facility because we are becoming more and more concerned with water supply in the future, and not only in the city, but in the region.

Thank you.

MS. FANG: I think the one concern, well, not one concern, but the biggest concern when we look at trying to get at the carbon-neutral goal is the cost of electricity. So we hear from our customers all the time. And as we continue to pursue these mandates which are great things to be supporting, the challenge does get to be, and we've heard from several today, about how do we get to these aspirational goals while still addressing issues like affordability and so on?

MR. MARTINEZ: For Southern California Edison, there's a lot of management interest in planning for climate change. From a forecasting perspective, that's been a big focus of ours in the last few years, which it had been when I joined the company five years ago. But we are starting to flush that out as do our long-term forecast. But also, needless to say, obviously, from a safety perspective, as well, too, it's just the changing conditions of the state, all the utilities face. So that's obviously a big focus of ours, as well, too.

MS. MILLS: Just a couple of points to follow up on what Cyndee said. Yes, our members do -- are concerned with the price of electricity. And many of them have sought out the ability to have their own solar or other types of renewable generation onsite and look at storage. And so that's an opportunity, in order to minimize the cost of electricity, that in the broader context with respect to the -- to agriculture as a whole adapting to changes in climate or changes in weather trends, too, that's been a constant process over many years that agriculture has had sight of. And that's manifested a lot of times in part by crop choice or varieties of the particular crop that you're growing.

And so they're mindful, farmers and ranchers are mindful of what they're planting, whether it's peaches or orchards or walnuts or almonds or something else, in selecting in varieties that either mature at a time that they're not bumping up against compromising weather, like rain in the fall, or that they're not blooming too early and so aren't subject to frost.

So I think as trends change, that's part of the research that's being conducted at the various agricultural colleges and research stations. They look at that and adjust as they predict the trends.

One interesting fact and anecdote is one of our members, I know, commented, it was a number of years ago, the same date, in one year there was a frost event on one of their orchards that had a big frost impact and negative consequence to the production of the orchard, three years later there was a heatwave and had a similar impact. And I don't know which came first, the frost or the heatwave, but you can see that it varies so much from year to year, and so it's difficult to predict.

But larger trends, they do try to select varieties that meet with their own operations and adapt to the changes that they're seeing.

MR. MCRAE: So I'll talk about two aspects of our changing climate and what we're trying to do to adapt, rising waters and fires.

In the Silicon Valley, we have rising waters, both the San Francisco Bay, we have creeks rising, we have the water table rising, and that's all relevant to things. I'll give a couple examples.

One, we have this great map in which you can show all the different Silicon Valley businesses which are dotted right on the bay of Silicon -- of San Francisco Bay. And I was at a meeting yesterday in which it was noted that if we were having this meeting in 2050, we would all have to be wearing hip waders because it's just going to keep going up.

And other anecdotal evidence. All of the airports, all three airports in the Bay Area, Oakland, San Francisco, San Jose, are all built on under -- on land that is under the sea level, so that's obviously a huge economic issue for us.

We co-led measure AA in 2016 to try to address rising waters. That was a $12.00 parcel tax on homes in the nine-county Bay Area. It raised the local share for building wetlands in San Francisco Bay. There's a great -- a report, I believe it's a Bay Area Council Report, which shows how much wetlands that we have to build in the San Francisco Bay to be able to be a sponge to absorb that rising water, and a lot of green infrastructure is going to be needed. We're trying to raise the local share for that. We're looking at both the state and the federal level to match that. And that's a huge effort.

And just, even though we've raised the money from the local side, there's just a lot of permitting issues. There are literally 14 different agencies involved in permitting all of those wetlands, so that is something that we're working very hard to try to make happen.

On the fire side, we supported SB 901 which was the omnibus fire legislation that Senator Dodd carried at the end of last session. And I will simply say that it's going to be a big conversation going forward. How are we going to address fire? How are we going to adapt to fire? How are we going to adapt to -- I mean, and a piece of that is the utilities' reliability issue and that will probably take up a lot of air space. But how are we going to prepare ourselves best for fires going forward?

And I don't think that SB 901 is the

final conversation, the final -- the end to that conversation. And we hope that there's going to be a tech aspect to that, but hopefully there can be Silicon Valley businesses that can help provide the technological solutions to solve those problems. But there's just a whole host of things that we're going to have to look at to be able to adapt to fires as our climate continues to change here in California.

MS. BEDSWORTH: Jeff, would you like to weigh in on preparing for changing climate?

MR. BELLISARIO: Yeah. I think Tim actually said it perfectly, so I won't say too much.

I think a lot of the work that we're doing, especially in Santa Rosa, on how to rebuild post-fire, so thinking about not just where to build but how to build and attempting to build more density and fire safety around our residential and commercial structures especially will be important, not just here in the Bay Area and Northern California but across the state.

MS. BEDSWORTH: Great. Thanks.

So now I want to leave time for you all to ask additional questions.

CHAIR WEISENMILLER: Yeah. I'm just going to start out.

Putting on your non-moderator hat but your Strategy Growth Council hat, do you want to answer the last question?

MS. BEDSWORTH: About preparing for --

MS. SPENCER: Yeah.

MS. BEDSWORTH: -- changing climate? Well, I tend to think of it, you know, basically, in a pretty integrated way. So I see a lot of the work that we're doing around reducing emissions as being a real part of that, but also how we build our communities to be more resilient. And that's the infrastructure but also how we support people and economies to make them as resilient as possible. And so that comes in with addressing and thinking about equity considerations, thinking about a lot of the issues that were touched on here, to me, strike me as a lot around resilience issues, so having a workforce that is capable, you know, is trained and capable and available.

You know, so I see it as, really, as a holistic issue that really ties together a lot of the topics that were raised here, housing and transportation and workforce and water. And so I think -- so that's how I think about an approach on how we start preparing for climate impacts. And I think it's really important that we're thinking about how our investments are supporting people and economies, as well, because ultimately that's such a key part of our long-term resilience.

CHAIR WEISENMILLER: So I was going to say, obviously, you and I were both at the National Academy event. And the thing we learned in terms of -- one day was California and one day was other states. But certainly states which we would think are fairly conservative and don't acknowledge climate change that, you know, have major agricultural production, people know something's changing. And you know, that a lot of those and, you know, some studies being done by -- at their universities were implying really massive changes in the crops they can grow, just from what's happening now.

MS. BEDSWORTH: Yeah.

CHAIR WEISENMILLER: Again, I don't know if you want to supplemental what I've said on that but --

MS. BEDSWORTH: No, I think -- yeah, we heard, if I recall, we heard from Montana and Kansas. I think both --

CHAIR WEISENMILLER: Yeah.

MS. BEDSWORTH: -- participated in that.

And also what struck me about those is how important that bottom-up information is. And so this was an event at the National Academy where we were talking about large-scale climate assessments, which tend to be often very research driven. And then some of these other states, you're really seeing that information coming up from folks on the ground, informing how they're approaching an assessment.

So I thought that was, also, an interesting piece of how you really need to marry the experiential, you know, what's happening on the ground with information that we're getting through models and measurement and monitoring.

CHAIR WEISENMILLER: Yeah. I think the other question, although again, this may be more for Heather in the follow up, you -- basically, Tracy had mentioned the change on environmental requirements on tankers and basically moving away from bunker fuel. And certainly, one of the questions that means is it can have pretty significant impacts on, well, the petroleum market, particularly in terms of the mix of, you know, stuff coming in of the certain mix, and then you need parts coming out. And as you change dramatically, you know, what's happening to the bunker crude?

Then that has implications back on your refinery mix and the products. And certainly, there have been some studies done (indiscernible), anyway, there have been people who have said there's going to be phenomenal price spikes in our oil market as that goes into effect, in part, depending upon how the tankers respond.

So it will probably be good for us to, you know, follow up with WSPA just on what do they see the implications in California of that new requirement on tankers? Unfortunately, she's gone, but I was going to ask Heather to do the follow-up on that with her, you know, in terms of the written comments.

And I guess, actually, both Edison and San Diego raised questions about rate design. I was going to ask generally, what would be your ideal rate design, realizing that some of the other participants at the table may shudder at this idea, or may want to respond?

MS. FANG: Well, I think when we look at some of the things that we identified as sort of the main trends that we see, I mean, the transformations that are happening in the electric industry, it's crazy. It's moving super-fast. And I don't know that the existing rate structure, I mean, we've still got shared (phonetic) rates in place where our residential customers is really right when we talk about sort of the evolution, you know, the very quick and broad expansion of CCAs and all of these renewable objectives. And how do we continue to pursue energy efficiency goals and avoid these sort of, you know, rate shocks?

And in particularly for San Diego, this past summer, we had a crazy hot summer. It was like the hottest August that we've ever seen. We had ocean temperatures that were, I think, in the 80s, which was crazy. So we actually had humidity, which we never have humidity in San Diego. And so what happened there is that we saw just huge issues with our customers based on the existing rate. So you know, obviously, customers were increasing their -- you know, turning on their ALISO CANYON.

And the unique thing about what happened this past summer is usually we have a couple of hot days and then it goes back to the typical San Diego weather. But this was a persistence of hot weather upon hot weather and so we had customers turning on their AC. And everybody understands that when they increase their usage their bill is going to go up. But if -- what we had were customers who would double their usage but their bills went up way more than that because of the exaggerated impacts that the shared rate structure set in.

And so we also have the issue of declining sales. I believe, and correct me if I'm wrong, it's happening far more rapidly in San Diego than it is at Edison and PG&E. So the CCA issue is separate from that, but when we look at the sales decline, solar penetration is happening much faster. Our average residential usage is like among the lowest across the country when we look at other IOUs. And so what that does is it does inflate our rates and so you end up with situations where bill volatility becomes a huge problem. And if CCAs are going to become a prominent feature of San Diego's service territory, the question starts to become, is this all an energy rate really the best thing if it creates bill volatility for our customers, you know?

And the volatility ends up being a big problem because customers can't predict, businesses can't predict. And so trying to consider something different I think is going to be really important to sort of help manage this future path.

MR. MARTINEZ: I would echo a lot of those comments from Southern California Edison. But I think that balance between grid reliability, resource adequacy, and customer choice, and also with the challenge that we just faced this past summer where we hit an all-time system peak on July 6th. And if that is going to be the future for us, that's a lot of balls for us to have up in the air and juggling. So I think that's, like San Diego, like PG&E, that's going to be a challenge.

CHAIR WEISENMILLER: Yeah. I was going

to say, the answer is that we'll be -- I think again, if you look at the fourth climate change assessment, the Scripps temperature distributions, we're not just talking of temperature rising, but we're talking a very volatile, you know, very persistent spikes. And you know, that has -- you know, certainly you've seen much more air conditioning in the coastal areas than people ever thought necessary.

And at the same time, that sort of persistent heatwaves and, to some existent, more persistence in the drought side means again, in terms of fires, a lot worse fires coming. I mean, that's certainly in the projections, the wildfires.

So again, it's not a pretty picture going forward. But we certainly have to figure out ways of adapting to that and having more resilient communities, just to deal with the realities. Obviously, reduce greenhouse gas is the less of an issue. But even from where we are now and what's, you know, in some respects, quote unquote, inevitable in the next few years as we try to bend the curve, it's -- you know, as I said, you're going to see a lot of spikes, so yeah, in heat and wildfires.

COMMISSIONER MCALLISTER: So as a comment and a question, and we're going to run out of time here and I want to have a few minutes for Bob to speak, and also for public comment, but I guess we've talked a little bit about equity, probably not enough. But one of the tasks that this Commission has is to figure out ways to improve the performance of our existing buildings. That's part of our energy efficiency policy for the most part.

But it strikes me that many of the problems that you're talking through in this integrated way, that Louise was referring to and your own -- you know, each of your comments in their own way has understood that there are integrated -- there are multi-benefits, multiple benefits to some of the -- actually, the best policies are the ones that have multiple benefits; correct?

So improving the performance in our existing buildings, and we're talking about people who own and rent, you know, not the homeless population, but it has all sorts of benefits. Like this volatility, if you actually

-- if your need for capacity for AC in your building goes down because you have better insulation, well, your volatility goes way down; you stay in Tier 1 and Tier 2, and you don't go up into Tier 3.

So I guess I'm hoping that some of you, maybe with South Coast -- I'm sorry, SCAG can maybe have some experience. I know that South Coast AQMD has some experience with this, maybe some others for your particular regions. Are there sort of templates, model programs that, not necessarily in the efficiency or even energy space, but that have impacted the housing stock, the existing housing stock in a positive way that could serve as models for pumping some resources into that to improve that piece of our infrastructure, which is, you know, a quarter to a third of our climate problem? SDG&E or Edison, do you have existing building programs that have had a big impact?

MS. FANG: The one I'm aware of is our ESAP program, so the Energy Savings Assistance Program. So what that does is it helps support energy efficiency investments, specifically for our low-income customers. I don't have specific details about it but we can follow up with more information.

COMMISSIONER MCALLISTER: Great. That would be great. And I'll note that there's a couple hundred million dollars that's underspent statewide in that program, so what can we use that money for?

MR. MARTINEZ: Certainly, I'll follow up, as well, too. I'm actually a Pasadena Water and Power Customer. I know they actually do have water programs, especially for their older homes, too, and their historic areas, which is where I'm present. I'll follow up on that, if you'd like?

COMMISSIONER MCALLISTER: In terms of the NPO, is there any of this on your radar at all?

MR. CHO: We are in charge of RHNA, Regional Housing Needs Assessment --

COMMISSIONER MCALLISTER: Um-hmm.

MR. CHO: -- so we focused on production of household increase in the future, and then consulted with HUD (phonetic). But we have not embarked in energy efficiency and related to housing stock.

COMMISSIONER MCALLISTER: Well, maybe there's a way to relate those two and sort of talk about quality of housing and, you know, quantity of housing, see if they'll intercept. So maybe there's a theme we can follow here.

MR. CHO: Yes. Yes. One of the changes we received just around RHNA is overcrowding. So it's related to the household health issues, and so I think we can touch on that.

MS. BEDSWORTH: There are some interesting pilot programs in Southern California that you probably are aware of that have looked at insulation and networked thermostats in low-income communities.

COMMISSIONER MCALLISTER: That's the South Coast --

MS. BEDSWORTH: Yes.

COMMISSIONER MCALLISTER: -- funded stuff?

MS. BEDSWORTH: Yeah.

COMMISSIONER MCALLISTER: Yeah, that's really interesting.

MS. BEDSWORTH: Yeah.

COMMISSIONER MCALLISTER: Bob, did you want to --

MR. RAYMER: Thank you, Mr. Chair and Commissioners. Earlier today, we were sort of going through the panelists very quickly and perhaps I didn't get enough into the weeds.

The community solar program that I'm referring to, when the Energy Commission adopted the new regulations back in May, in addition to doing the solar mandate, in Part 6 of our energy regs, they adopted a page-and-a-half of sort of skeletal regulatory structure that sets up a new option for the builder, known as community solar. Those administrative regs do not limit it to -- it's not a requirement that the builder own and operate the solar farm. It could be a city or county. It could be a third-party solar entity. Most importantly, it could be the utility.

And case I point, SMUD is already kicking off what they call a SolarShares Program. The regs require that there be up-front financial advantage to the homebuyer from day one. So there's a financial commitment that the builder makes to SMUD, I think it's to the tune of $400 a kilowatt. So in Sacramento, we've got to do three kilowatts on average.

The bottom line, though, is this is an opportunity for the electric utility to continue to be the electric utility. It makes it far less difficult from a logistics standpoint for the builder to have to worry about this and that and ordering this and making sure it's the right price over here. At the same time, the utility already has the infrastructure. They get to remove a credit, et cetera. So there's so many advantages to this. What we're trying to do is now look at the IOUs for this.

But more importantly, if we can get this to work, for new residential, this is the blueprint for existing housing, existing commercial and new commercial. There's no way, you know, for a 15-story commercial building in Oakland that may need nine-and-a-half acres of solar, you know, we calc'd it out, you're not going to be able to do that, and so we've got to figure out how to get this done.

We would love to see the utilities continue to be the utilities. That's probably the easiest business model here. So we'll be working on that for the next 12 months.

MS. BEDSWORTH: Okay. Well, then with that, I will thank all of the panelists in both rounds. We really appreciate all the information. Thank you.

MS. RAITT: Thanks.

CHAIR WEISENMILLER: Thanks for your participation.

MS. RAITT: This is Heather. And so I think if Commissioners are ready, we could move on to the public comment period. So I don't have any blue cards, but I don't know if there's somebody in the room who would like to make comments?

Do we have anybody on WebEx? All right. All right.

Okay, it looks like we don't have anybody in the room who wanted to make comments. And nobody on WebEx.

Can we open up phone lines, just quickly? So if you're on the phone, please mute your line, unless you wanted to make a comment. Okay. I think we're hearing background.

So I don't think we have any public comment.

And then I'll just remind everybody, the written comments are welcome and they are due on January 31st, two weeks from today.

CHAIR WEISENMILLER: All right. And I wanted to thank people for helping us kick off the new IEPR. Certainly, interesting conversation today, really highlighted we need to deal with and do better co-locating housing and workplace and reducing transportation. All right. Yes. So we just wanted -- yes.

Anyone else? Meeting is adjourned.

(Off the record at 3:09 p.m.)

REPORTER'S CERTIFICATE

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.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 4th day of March, 2019.

Susan Palmer
Certified
Reporter
CERT 00124

TRANSCRIBER'S CERTIFICATE

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.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 4th day of March, 2019.

____

Myra Severtson
Certified Transcriber
AAERT No. CET**D-852