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STATE OF CALIFORNIA

CALIFORNIA ENERGY COMMISSION

In the matter of:

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	)
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	)

COMMISSIONER WORSHOP ON THE CLEAN ENERGY

INTERCONNECTION - BULK GRID

REMOTE ACCESS VIA ZOOM

THURSDAY, MAY 4, 2023

10:00 A.M.

Reported by:

Martha Nelson

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INDEX

INDEX

INDEX

P R O C E D I N G S

10:00 a.m.

THURSDAY, MAY 4, 2023

MS. RAITT: Good morning, everybody. Welcome to today's workshop on Clean Energy Interconnection with the Bulk Grid. I'm Heather Raitt, the Director for the Integrated Energy Policy Report, or the IEPR for short, so welcome.

The workshop is being held as part of the Energy Commission proceeding on the 2023 IEPR. I'll just make a few logistical announcements before we get into the substance of today.

Next slide, please.

So this is a remote only workshop. And to follow along, the main schedule and presentations are documented and posted on the CEC's IEPR web page.

This workshop, as all IEPR workshops, is being recorded. And the recording will be linked to the CEC website shortly after today. And then we'll have a written transcript that will follow in about a month or so.

We have a really full agenda today, packed with lots of good stuff, so we will not, unfortunately, have time to take questions from attendees during the workshop. However, attendees may make comments during the public commentary at the end of the day.

And we also welcome and encourage written comments. And instructions for doing so are in the workshop notice. And written comments are due on May 23rd.

And so this is a reminder to all of us today, so we can have an accurate record and help folks follow along who may be on the phone, please identify yourself before speaking.

And with that, I'll turn it over to Commissioner Patty Monahan, the Lead for the 2020 IEPR. Thank you.

COMMISSIONER MONAHAN: Thanks very much, Heather. And thanks to everybody for joining. Sorry, it took me a second to unmute myself.

So I first want to thank my fellow energy agency colleagues for joining the dais today. We have representation from the Public Utilities Commission, from CAISO, and from, of course, the Energy Commission.

And I want to thank all the folks that have been involved in putting on this workshop and the series of workshops. So first, I want to thank my Advisor, Ben Wender. I want to thank, actually, Vice Chair Gunda's team, who has also been deeply involved in helping us set the agenda and get the speakers. And of course, to Heather Raitt and her excellent IEPR team for leading us for so many years, steadily with these workshops.

So this year's Energy Policy Report is focusing

on speeding the deployment of clean energy resources on the grid. In past years, we've done a big report every two years that has really focused on the broad suite of activities that the Energy Commission undertakes, you know, really focusing on the various divisions.

We're trying something different this year, and I want to acknowledge that. The strategy is building on last year's report that Vice Chair Gunda led, but we're really, we recognize that California's grid is central to achieving our clean energy and climate goals. We need to plug in transportation and buildings, which is going to -- unlike past years, where we've been trying to decrease load, we're trying to increase load. We want beneficial electrification to accelerate, and we need to integrate renewables and storage at record rates.

So we know that the grid is going to be sort of the foundation upon which our clean energy goals are going to be achieved. It's not the only, of course, energy strategy that we're going to need, but it's a critical one. And as the Air Resources Board and the transportation space passes regulations, like they did last week for Advanced Clean Fleets, we know that making sure that there is infrastructure for zero-emission vehicles, battery-electric zero-emission vehicles to plug in is going to be critical.

So I want to acknowledge that we are starting

from a platform of strength. All of the energy agencies represented here are taking actions to speed the deployment of clean energy resources on the grid. And the morning session is going to highlight some of these activities, not all of them. And we want to make sure that the report really does a good job of collecting from every energy agency the suite, the activities that are currently being undertaken. And then the afternoon session is really going to focus on what more can we do. We welcome ideas.

As Heather said, the agenda is packed. So we strategically have done that. We want to have a day of, I call it speed dating, energy speed dating, where we're going to have a lot of different people speaking, a lot of different ideas. We welcome those ideas here today. But we also welcome you to submit into our docket so that, you know, these packed workshops are not the only place that are going to be an opportunity for ideas to be put into the hopper.

So with that, let me pass the baton over to Vice Chair Gunda for his comments.

VICE CHAIR GUNDA: Thank you, Commissioner Monahan. Good morning to everybody in attendance. And again, thanks to the dais here.

Commissioner Monahan, you set the stage really, really beautifully. And I want to just, you know, extend

thanks to you for leading this really important IEPR discussion. And as you mentioned in your opening remarks, you're really kind of bringing a vision of all California in the report. It's a report that reflects all of our work together rather than just the CEC's division. So really appreciate and commend your kind of interest in bringing all the vision together here.

And I think it's such a timely topic as kind of supporting the work on both SB 100 and reliability. I see the interconnection, the ability to both connect the load, but also connect the generation is pivotal for the next five years and able to deliver our climate agenda. So it's a really important topic and look forward to supporting you and your vision.

And also just a big thanks to Ben on your team and Heather, and Heather as usual. And Ben, I just found out how amazing the skills he has in terms of flowcharts.

So Ben, I'm just really appreciative of your ability to take these complex things and put in the flowchart.

So looking forward to the discussion and looking forward to being challenged and a term that I recently heard at one of our Western conferences, annoyingly creative. So hopefully we are annoyingly creative in solving this issue. So thank you so much.

COMMISSIONER MONAHAN: And let me, I'm going to mix it up, mix agencies up a little bit and turn it over to Chair Reynolds for her comments.

PRESIDENT REYNOLDS: Great. Thank you, Commissioner Monahan. And thanks so much for your leadership and vision on this year's IEPR. I'm just really pleased to be here on this virtual dais with Commissioners from CEC and CPUC, and also of course, leadership from CAISO.

And as you noted in your introduction, we really are at a transformative moment right now. There's just so much momentum towards achieving deep decarbonization goals, but also so many challenges and hurdles that come with that. And so I really appreciate this year's IEPR and that it has a focus on how we can work together to accelerate the connection of clean energy resources to transmission and link it to what we need to do with the transmission and distribution system. That issue is really so much of the work that we do at the CPUC and really across all of our agencies. And that's why interagency coordination here is so critical.

And as we know, we have a really tall order before us. The Joint Agency SB 100 Report shows that we need to add up to 6 gigawatts of renewable energy and storage resources each year out to 2045 to hit our

reliability and GHG targets. And we know that if we're going to hit the targets, we have to improve alignment between how we do resource planning and transmission interconnection so that developers and stakeholders have maximum transparency into where capacity must truly go to support the grid needs.

So I did want to say a couple things about what we're doing at the CPUC in the IRP transmission process to just provide some framing and get us warmed up for the day.

So briefly, CPUC staff is continuing to expand and refine our busbar mapping process as California's resource portfolio grows. And we've added more transparency and opportunities for stakeholders to engage in the process.

And then also for the next cycle of mapping, CPUC staff are working to incorporate new CEC land use and environmental screens and updated transmission information from the CAISO and information on substation interconnection availability on costs.

And then also a brief mention of the Interagency MOU on Transmission Planning from this past December. The CPUC is considering how we can explore the appropriate level of information and guidance needed by market participants to make sure we get the resources that we need when we need them.

So a lot of work underway, but so much more to be done. And I'm really looking forward to the day today and looking forward to hearing from all the presenters and stakeholders as we come together to try to solve these challenging issues. They're certainly not insurmountable, although I, you know, would say again that they're very challenging.

I did want to thank the staff for all the work to prepare for this workshop, especially the CPUC staff and all their hard work, but also highlighting and expressing my appreciation for the coordination that I know is happening across our agencies. So thank you for that continued work.

And with that, I am looking forward to the speed dating. Thank you.

COMMISSIONER MONAHAN: Alright, let me pass it over to President Mainzer from CAISO.

PRESIDENT MAINZER: Thank you very much, Commissioner Monahan. I wanted to also express my appreciation to you and all of the folks who've worked so hard to put this, I think, important dialogue together today.

I wanted to take a number of the key themes have already been emphasized, but I think all of us here today recognize that, you know, decarbonizing the fourth largest

economy in the world is a monumental challenge and a huge opportunity for all of us. And it is going to take a tremendous vision and coordination, creativity, maybe even some annoying creativity, collaboration, and that intense focus on delivering results. And certainly at the ISO, you know, we feel a profound sense of responsibility to contribute positively to all of those things. And just a couple of items.

I think many folks know that last year in 2022, we put out our first 20-year outlook. We thought it was really important to be able to step back and take a look at that long-term architecture of the grid in California to meet the SB 100 objectives. What does that mean for in-state, offshore, and out of state transmission development?

President Reynolds already mentioned the work that we did together last year to codify the new MOU, where we can do a much better job of synchronizing power, and transmission planning, and then of course interconnection, queuing, and procurement. All of these are parts of gearing that has to work together in a highly synchronized fashion to be able to onboard those 6,000 megawatts of new resources every year.

We of, course have, an open docket right now, another round of interconnection process enhancements that I think all of us recognize that interconnection queuing is

fraught with complexity. It's a major issue not only in California, but across the country. We're absolutely committed to addressing those issues, all the way from, you know, everything from subscription right down to deliverability.

And then of course in a couple of weeks we'll be taking to our Board of governors for approval of the 2022-2023 Transmission Plan. And this is a plan that the model is bringing as much as 70,000 megawatts of new generation onto the grid in California over the next ten years. This is directly indexed to the policy goals of the state of California and the reliability needs of the grid. It's a 46 project. It's a big price tag at over $9 billion. But we think we're now very focused on meeting the challenge and making sure that our transmission planning, interconnection queuing, and process procedures are up to the challenge of meeting SB 100.

So thanks again to all of the people who are here today. Tremendous partnerships, very open to new ideas and make sure that we're all working together to keep on track to meeting these very, very important environmental and reliability objectives. So thanks again to all of you.

COMMISSIONER MONAHAN: Great. Thanks, President Mainzer.

Alright, let me pass it over to Commissioner

McAlister from the CEC.

COMMISSIONER MCALLISTER: Great. Well, thanks a lot, Commissioner Monahan. And just reiterate and emphasize all the thanks to the staff across all of our agencies. They really are kind of aware of the rubber meets the road and really get the ball moving forward. So, you know, just recognize a lot of behind the scenes, but huge amount of effort.

Just I won't repeat what folks have said. I agree with all the points about how critical this collaboration is. The electric system is the backbone of our decarbonized future and it has to be up to the task, really, as the top priority. Our collaboration and just the collegiality across the agencies and the sense of mission is just as high as it's ever been, I think.

And, you know, our grid is going to grow, as Commissioner Monahan, you said, you know, our load is going to grow over the coming decades. And so we need to interconnect both the right loads and the right supplies at all scales.

And so today we're talking, you know, more about the bulk power grid, but really up and down the whole electric grid, making the right decisions and managing investments from individual loads and individual, you know, homes and businesses, all the way up to the distribution

grid, all the way up to the to the bulk transmission grid and the supply that's connected to it. All of these issues are interrelated. And, you know, we our collaboration can support, you know, I think smart policy in a coordinated way across the board here, so really optimistic about that.

There's just a lot of great momentum building planning tools and process, not only in California, but across the West, really interesting conversations happening. I think, you know, Vice Chair Gunda referred to that as well. So I think there's just a sense of mission here. And I'm looking forward to hearing the presentations for today and, you know, continuing and building our collaboration across the state, and today's a sort of key moment in that.

And finally, I'll just say, Commissioner Monahan, just your vision defining this topic and really focusing in on it reflects the criticality. A lot of other things revolve around this conversation, getting our interconnection ducks in a row and really streamlining and accelerating the planning of supply and transmission and, you know, with relation to all the load centers that they have to supply. And I think that need-based assessment is something that we're necessarily coming back to in the state. And it's just incredibly appropriate. And this is a great forum and convening for that discussion to advance,

so thank you.

COMMISSIONER MONAHAN: Alright. Thank you. Well, I'll give the last word to Commissioner Douglas, my former colleague here at the Energy Commission and now my colleague at the CPUC.

So Commissioner Douglas.

COMMISSIONER DOUGLAS: Thank you, Commissioner Monahan. And great to see you leading this IEPR and this topic. And I just really appreciate the opportunity to be here with all of my colleagues across the PUC and ISO and want to share and join in the appreciation to the staff for pulling this together.

And I'll be very brief because I think we've said it in our introductory comments, but this is absolutely critical. We just have to move forward to move forward and get the projects online that we will need to cement our energy transition and meet our climate goals and maintain reliability. And, yes, there are obstacles. And, yes, there's a need for creativity. And really all of us have a role to play in making this successful. And so it's so important that we're all here and we're all focused and prepared to play the role that we need to within our jurisdictions and responsibilities, and also in close collaboration with each other.

So I'm very much looking forward to the workshop

today and appreciate you bringing us all together, Commissioner Monahan. Thank you.

COMMISSIONER MONAHAN: Well, and I want to acknowledge two colleagues that didn't make opening remarks but are on the dais. So we have Commissioner Reynolds, who's in the car, so he might be popping up, a disembodied voice and the newest CEC Commissioner, Commissioner Gallardo, who was our public advisor. And for those of you who know Commissioner Gallardo, she's a force for good. So we're excited that she is joining us today and on the panel and just writ large joining the Energy Commission because we have a lot to learn from her.

So with that, I'm going to pass it to my Advisor, Ben Wender, who's going to be sort of the master of ceremonies today.

MR. WENDER: Thanks very much, Commissioner Monahan, and all of the representatives on the dais. Really excited to hear this dialogue today, have you all participate and follow your keen leadership through this exciting decade.

To start us off, I want to invite my colleague, David Erne, to join and contextualize how this year's IEPR fits within many of the initiatives ongoing here at CEC. David is the Deputy Director of our Energy Assessments Division, and he's going to both describe some activities

here and give a foresight into some of the discussions we'll have today.

Take it away, David.

MR. ERNE: Thank you, Ben. Can you hear me alright? Great.

Good morning, everyone. Good morning, all the leaders on the dais, thank you for joining us today, and the nearly 200 participants who are here to listen in on this topic, which is great to have that participation for such an important topic.

I'm going to go to the next slide, by the way.

So I'm going to be giving a little bit of overview of the workshop today and also some context of interconnection relative to reliability.

This is the first of our workshops on interconnection. We're discussing the bulk grid today, and we're having the distribution system interconnection next Tuesday, so please join us for that as well. And the reason we're covering both of those is because obviously getting resources on for both the distribution system and the bulk grid system are important for us to be able to meet our clean energy goals, and there are challenges with both of them. Some of those overlap and some of those do not, but we want to be able to consider the challenges with interconnection in totality for the state and make sure we

are on path to make both of those processes as rapid and as safe and reliable as possible.

So let me walk through, first of all, a little overview of the context for today or our workshop today, so we can go to the next slide.

Following my introductory comments, I'll have Shannon Eddy join us. She's the Executive Director for the Large Scale Solar Association. She's going to give an overview of the perspective of interconnection relative to California's clean energy goals, so the very overarching broader umbrella of how these fit into our meeting our goals.

After that, and questions with the dais, then we'll go to a panel that will talk about really the first critical stage of interconnection, which is the planning process, and so we'll have CPUC, Cal ISO, and LADWP giving overviews of the planning process and identifying those resources necessary to get online to meet our reliability goals. And then that'll be followed by a more detailed conversation with the panel of utilities talking about, and Cal ISO talking about the process, so getting into the details of exactly what goes into an interconnection, the factors that they're looking for, how they're evaluating what has to happen for these resources to come on quickly, but also, again, safely and provide reliability for the

grid. And then we'll close out, that'll close out the morning.

In the afternoon, we'll have a panel of developers who will be talking about the perspectives on interconnection and the opportunities and challenges they're seeing in the state. And that will be followed by a panel that will talk about recommendations for improvements and start the brainstorming about ways that we can improve our processes in the state beyond all of the activities that the Cal ISO and CPUC and the utilities are already working on for improving our processes.

So that's an overview of our workshop for today but let me put some of this in context with reliability, so next slide.

Through our sense of analysis of reliability over the last few years with the joint work by the CEC, CPUC, and Cal ISO, CEC kind of articulates these challenges for California in three separate overall buckets.

Improving our planning processes; we have worked to do in thinking about how to really incorporate climate change and climate change-induced weather variability to our planning to make sure our planning is taking into account that we're seeing a different environment now than we've seen in the past 20 or 30 years.

Ensuring that we get those resources identified

and on the grid in a timely and appropriate manner so that we meet our reliability needs. That includes improving our processes on interconnection and permitting, which are critical elements to getting these resources online. Those are the planning elements.

We also see the need to expand the scale of and the diversity of resources on the grid. We've talked in the past about some of the supply chain issues with solar and storage. Having a broader diversity of resources available to the grid will make our system more robust and certainly help us with ensuring that we're going to meet our needs in the long term.

And then lastly, we are going to have events, events like we've seen in 2020 and 2022, where we have these extreme heat events that really challenge the grid. And making sure that we have a set of resources like the Strategic Reliability Reserve, which we loosely refer to as like contingency resources, that are available during those events that we can rely on, we can count on to be able to help support reliability during those events.

So those three things are kind of our main challenges that we're seeing.

Next slide.

I want to put that in context with not just California, but broadly across the West. So we're not the

only ones dealing with supply chain issues, interconnection permitting. Those across the West are also dealing with those issues. And as we mentioned, as you've seen in the press, leading back to a *New York Times* article in February, it's happening nationally. And so we're not alone in this process, but we are very forward thinking in our policies, which means the drive for expanding our clean energy resources in the state is going more rapidly than in many states, which puts us at a point of being more important for us to focus on this and get this right in the near term.

In addition, we want to keep track of our existing resources and making sure that we're on track with our existing resources. We know that in the past few years, we've had hydro -- we had drought, which has caused challenges of hydro. Not likely to be a problem this year with the record amount of snow and rain that we've received, but certainly something we need to keep in mind during climate change events about the potential for drought in California and how that's going to affect hydro, which is a key resource, again, not just for us, but Northwest as well.

And then we have a West-wide type market. All of this competition for resources is tough and it's making the competition for that greater across the West.

Next slide.

So this one is a little bit difficult of an eye chart but let me just kind of talk through it at a very high level. And what you really want to focus on first is, in any one of these charts, is the gray and the yellow. So the gray represents, for example, CPUCs procurement orders for resources. That's the shorter line in each of the graphs. And then the yellow or gold represents the preferred system plan. And those are the resources that we want to be able to bring online. The green line represents an average build rate of those resources since 2011. The blue line represents a maximum build rate that we've seen for those resources since 2011.

And you see the challenge with meeting even the existing procurement orders and the preferred system plan is going to be a challenge for the state. We need to be above our average. We need to be more towards the maximum and maybe even above the maximum to get to the point where we're building these resources and getting them integrated in a fashion that is going to be providing reliability for the state.

So this is just trying to drive home the point of we have a lot of work to do to get these resources online and interconnected to support what we know we already need.

Next slide.

But what are we doing? We're doing a lot to make sure that we have maintained reliability. We've expanded our summer planning substantially. We have coordinating our reliability analyses. So Cal ISO, CPUC, CEC all conduct reliability analyses. We compare those, contrast those and evaluate those, understand what's happening in the near and mid term. And the CEC is developing the capability to look long term for our SB 100 goals to incorporate into our next SB 100 report.

We're also actively, as multiple entities, tracking resources, both the resources, the new resources coming online, as well as contingency resources in preparation for the summer to ensure that we know where those projects are coming online, that they're available when we need to have them. And if they're not, then we're working to overcome the barriers.

We've developed the Tracking Energy Development Task Force, the TED Task Force for short, which is a combination of CEC, CPUC, Cal ISO, Governor's Office of Business Development, all looking for ways that we can monitor these projects and see if we can help to overcome obstacles to get them online.

Each of the agencies or each of the energy entities is also looking at processes internally and ensuring our internal processes in preparation for the

summer align with Cal ISO's System Operation Emergency Plan, so that we're all in sync with ensuring that all the actions that we take happen at the right sequence to make sure that we provide for grid reliability in the most responsible manner.

And also, which is very, very critical, is real-time communication at senior levels. This is happening as we speak weekly, it becomes more rapid during upcoming heat events to be able to prepare, plan, and respond to those heat events and having that senior leadership engaged like the entities on the panel or the folks on the panel -- on the dais, excuse me, that are constantly in communication to ensure that we are taking all actions necessary in a coordinated fashion to meet those needs.

Next slide.

But it's not just the folks on the dais that are taking these actions. We have a lot of legislative drivers. Last year was a really extensive legislative or busy legislative season that identified a number of actions related to reliability that laid them out. These actually just relate to those for CEC, so it's a much longer list than this. But this action took several steps that are important to point out.

Strategic Reliability Reserve was established last year to help us with contingencies in the summer

during heat events. We set in motion a process to evaluate whether to extend Diablo Canyon as an additional resource beyond its retirement in 2025. And it asked for the CEC, in coordination with CPUC and Cal ISO, to identify investments the state could make to support our clean energy goals as part of a Clean Energy Reliability Investment Plan, or CERIP, and I'll talk about that in just a minute.

Next slide.

This simply illustrates the many deadlines that we have over the course of this year to get these reports out to inform the legislature and stakeholders about these activities. I won't spend a whole lot of time here.

And I'll talk just briefly then about the Clean Energy Reliability Investment Plan, which is the next slide, where we identified priorities to fund, again, for the state through this $1 billion that would help enable investments. These are planning improvements or setting up other capacity building activities, as I mentioned, scaling both supply and demand to create diversity of resources for the state and augmenting extreme events.

Next slide.

And this is simply just to point out priorities or how we identify priorities, which is of the $1 billion that the legislature asked us to develop the plan for over

a three-year period, we prioritize the majority of funding for scaling demand-side and supply-side resources to get this diversity of resources available to the state and ensure that we have a diversity for our grid.

So the last comment I'll make is just the final slide is giving an overview. We will be having our annual summer reliability workshop on May 17th, the public notice will go out either later today or tomorrow, where we'll be talking about the summer situation, what's coming up, overall overview of the reliability assessments that have been conducted. We'll talk about and give an update of the Strategic Reliability Reserve and what that's ready to provide for the summer, as well as having a panel to talk about supply chain issues.

So with that, I will close out and actually turn over to Shannon Eddy, who's the Executive Director of the Large Scale Solar Association, who will give us that overview aligning policy with interconnection.

MS. EDDY: Great. Thanks, David. I'll rely on you all to give me a thumbs up or something if you can't hear me. But just good morning, everyone. It's really nice to see you. I'm happy to be able to speak with you this morning.

So in looking at the agenda and the presentations we're going to be seeing today, it's clear that you're

going to be hearing from multiple experts on the details involved with building out and interconnecting to the transmission system. And I've been asked to do some stage setting about the role of transmission and meeting our climate targets. So I'm going to stay pretty high level and focus on a few key themes that we can keep in mind both today and as we take next steps.

So when I was a kid, my dad would come down every morning when we were eating breakfast and do two things. He would tell a dad joke that he heard on the radio and he'd talk about the weather. I'm going to spare you the bad jokes. I think we've seen enough of those recently and touch for a moment on the weather or rather the climate.

It goes without saying, and yet it bears noting that we're witnessing the effects of climate change decades earlier than the models projected. Last month alone, Spain saw days of sustained temperatures above 100 degrees. Fort Lauderdale got two feet of rain in 24 hours. And there was a report of a new study finding that ocean temperatures have reached just astronomically high temperatures. And apparently we also have an El Nino on the way, which is predicted to raise weather temperatures even further.

Climate change is right now pushing parts of the world past the point of human survivability for parts of the year. That's why we're here today. We're here to

address the climate emergency.

The UN and the IPCC say that we must reduce global climate emissions by nearly 50 percent by 2030 if we're to keep temperatures to 1.5 degrees Celsius in terms of the temperature increase. President Biden set a goal of reaching net zero emissions by 2050.

And let's go to the first slide here.

And here at home, California has set so many climate targets it's hard to keep track of them sometimes. I even confused Fran Pavley's two climate bills. She's got AB 32 back from 2006 and SB 32 from 2015. Only Fran could confuse us with two groundbreaking climate bills with the same number.

The sweep of legislation that we're looking at now puts us in the position of decarbonizing the state across the economy. That means shifting from fossil fuels to electricity in our homes, our buildings, our ports, and our transportation sector. And we need to decarbonize our electricity grid at the same time. Of course, everyone's been talking about that. The confluence of those efforts is driving a threefold growth in our grid, probably fourfold if we decide to abandon the gas plants altogether.

This is an incredible task, so incredible, in fact, that it took us several years to get our heads around it.

So let's check out the next slide.

So this is a great slide from Jeff Billinton at CAISO. In addition to showing our planning trajectory, it also reveals that it took us a few years to get used to the idea of needing so much new resource in such a short period of time. SB 100 was signed in 2018, and yet it was only late last year that we finally landed on this portfolio.

And I want to be clear, it takes guts to do this, to point to a distant star and say, we're going to be going there. Nobody's ever gone there before. And so I applaud the Commissioners and the staff for getting us this far.

The punchline, of course, that you've heard before, you can hear it again, is that we need 86,000 megawatts added to our grid in 12 years. What this slide doesn't show, but what the SB 100 process finds, is that we need another 70,000 megawatts in the ten years after that. So this is unprecedented.

I want to mention, too, especially in light of the net metering lawsuit that was filed, sounds like filed just yesterday, that these numbers don't include but they do account for an expected 34,000 megawatts from rooftop solar by 2045. We won't spend time today talking about the merits of DG versus utility scale renewables. That's not the focus of the workshop. And to be clear, the need is so great on so many levels that we need all the rooftop and

all the utility scale power we can get. And my hope is that we can finally put that debate behind us.

To come back to it, our current transmission grid can't accommodate an additional 86,000 megawatts without new lines, new poles, new substations, and we need it quickly.

Let's take a look at the next slide. Alright. It's switched around a little bit. Why don't you go to the next slide and then we'll come back? There we go.

Let's take a look at interconnection. So when it comes to ramping up clean energy, California's problem is not a lack of projects. Project proposals we have in abundance. And this is what's currently in our interconnection queue dating back to projects that entered the queue in about 2015.

Now Cluster 15, the interconnection window that just closed last month, saw a record breaking number of 541 interconnection requests totaling 354 gigawatts. We're seeing this kind of dynamic throughout the country as other states work to decarbonize. And everyone is running into the fact that we just didn't plan early enough to build out the transmission system. LBNL released a really good report on this last month. It's worth checking out.

And the challenge, again, isn't that we have too many projects vying for too little grid space, it's that

our entire system and our planning processes weren't really set up to handle this kind of accelerated growth.

So let's go back to the previous slide. There you go. And let's look at the challenges.

So this is just a high level snapshot of the challenges that we're facing right now. We're short on transmission. Upgrades that were approved a few years ago are delayed. We're short on engineers to do the work. And our interconnection processes weren't really designed to handle the volume.

Now to the exceptional credit of the regulatory staff, and I know Elliot and others have touched on this today, all of you sitting on the virtual dais, a lot of these challenges are being addressed right now. We have new tools that are in use more on the way. You're going to be hearing a lot about this during the workshop today.

And so I'm going to leave it here and let's take a look at the next slide. It's actually two slides forward now. There you go.

So this is what the 2035 buildout will look like around the state. And again, good credit to CAISO. This is a fantastic map and you're going to be seeing this a lot because it helps us visualize where transmission is going to be going, where new transmission will go, and where the new projects are needed. And then all the expected

megawatts.

And the next slide. Good. Okay.

So this one is important because electrons need to get delivered to load. And when it comes to interconnection planning, developers are still a little bit in the dark about where delivery capacity exists on the system. So in order to expedite project siting, developers are seeking more insight into specifically how much delivery capacity exists or is expected to exist in various points on the system. And so we created this slide to just indicate sort of what's in the queue right now. And then some of the gaps that we're hoping can be filled as we get into this process. We think it'll help things move a little bit more quickly.

And then we can go to the final slide.

And I want to come back to what this is going to take. We're looking for superlatives to describe what we're facing here. We're contemplating unprecedented build out the likes of which none of us have ever seen. To me, the decarbonization goals across the country, we must build terawatts of new renewable energy.

We're talking about the biggest shift in land use patterns in modern history. And if you think that it took us a while to get our heads around the idea of getting to these numbers, then it's not a stretch to understand what

it will take for the public to get used to the reality of it. So let's talk about that for a minute.

Building new transmission lines has historically taken about eight to 12 years. That's all the time we have to meet our 2035 energy goals. We don't have room for delay. We don't have room for error. Everything must go perfectly. And we're asking the public to accept a massive new infrastructure build out against the backdrop of incredible uncertainty where our political, our social, our economic norms are completely in flux and where our climate is rapidly changing. And we don't generally do very well with change.

And so it's incumbent on us to bring the public into the fold on this as soon as we can to let them know why this transition to clean energy is important, how it can benefit them and, yes, that it will mean more changes are coming and that we need their help. We're in this together. And so let's find a way to amplify that message. And let's also stay on track with timing and to Elliot's point, be creative about how we cite and build both the projects and the transmission.

So to bring it all together, it's not an overstatement to say that our climate targets rely on bringing exponential megawatts online. And those megawatts rely on bringing exponential transmission and

interconnection all together. So it relies on you, that relies on us.

So thanks for the time. I look forward to taking any kind of questions you have and being a part of today's workshop.

MR. WENDER: Well, I'll just say thanks so much, Shannon and David, for framing up the problem and a lot of the highlights of activities coming up. We have about 10, 15 minutes available for questions from the dais for either Shannon or David.

We'll pass it to Commissioner Monahan to start us off.

COMMISSIONER MONAHAN: Yeah, and I encourage anyone on the dais, anybody from my fellow agencies, if you have questions, pop on the video. And I want to make sure that there's time for everybody to ask their questions, especially I think, Elliot, who I'm guessing will have the most comments on this.

So just, again, thanks to David Erne for -- who is actually our new Deputy Director for Reliability and Emergency Planning. We're very lucky to have David in that role. So thanks for the stage setting, David.

And Shannon, I'm wondering if you could just expand on the recommendation that you make on accelerating state regulatory decisions regarding transmission and

interconnection while also ensuring there's time for public input? Could you give a little more flesh on the bone for that recommendation?

MS. EDDY: I'd say we're probably finding flesh for the bones on that one. I think the main message is that we can't afford any delay at the regulatory level. And so the pressure is really on us to not tap the brakes and to keep moving forward at the same time moving forward thoughtfully. Because as these projects are coming online -- I mean, let me step back for a moment.

Renewable energy projects are being opposed around the country right now. We are seeing opposition that's more organized, more sophisticated on a lot of different levels. And that's before we even get to the question of siting transmission lines, which have also historically faced some fairly significant pushback.

And so when we're looking at the kind of major build out that we're contemplating here, we're not really sure the public is ready for this. And so we want to make sure that they can be engaged as early as possible. A couple of the network upgrades, several of the network upgrades that are in process right now are probably already getting pushed back from the public. And so when we look at trying to build the kind of transmission and project development that we need in this 12-year period, the first

tranche, all of these projects need to go through public processes.

So I guess what I'm saying is that I want us to leave as much time as we can for public engagement so they feel like they're involved, they feel like they're engaged, feel like they're enrolled in the process.

PRESIDENT MAINZER: Commissioner Monahan, this is Elliott. I think that Shannon and David both did just a fabulous job of characterizing things. And I'm glad to see that, you know, we're all now starting to really be able to stare at the challenge. You know, the maps and the zonal approach to transition planning is something we've been doing very, very consciously.

Obviously, the interconnection queues represent a phenomenal supply of potential clean energy resources, but we're now trying to match that back to the actual demand, the places where we think we can get transmission built and to really better synchronizing interconnection queuing and the procurement of resources as efficiently as possible.

Shannon, I'd be interested, you know, from your perspective, and you understand the issue from so many different perspectives, if you have any other sort of specific recommendations where you see any other process breakdowns or any other things that we can do at either the PUC or the Energy Commission or the CAISO or any of the

other, even legislature, that can further reduce friction in the system and make sure that we can get the transmission built and the resources on board it as quickly as possible? Any other ideas that you'd want us to be thinking about collectively?

MS. EDDY: Yeah, some of it's legislative. SB 420, which is Senator Brecker's bill, extends the environmental leadership project -- or excuse me, the Environmental Leadership Program essentially to new transmission lines, which doesn't lend a huge amount of streamlining on the front end but it does truncate any kind of legal windows on the back end, so that would be helpful. Right now the sunset, or it's about to be amended, so the sunset is extended by four years.

I think we should consider seriously having all renewable energy projects, and this is a big ask, but having all renewable energy projects be eligible and immediately, I would say, assigned to this environmental leadership project just so we can -- as environmental leadership projects, sorry, just to keep things like that moving.

I think as we're watching the IRP play out, and it's about to get started, just making sure that the IRP stays fairly tightly focused. Because it does, to your point, it does sound like the state's going to be both

directing procurement in very certain areas and also to certain zones, and it's likely, based on some of the conversations that are happening at CAISO, that interconnection is going to be pretty tightly linked to that. So getting those answers sooner rather than later is going to lend the certainty that developers need to move projects forward in the timeframes that they need.

And I'm still thinking about, you know, the extent to which we could do some sort of public outreach, public education, sort of at the state level, even at the national level, but we can leave that to some other conversation.

PRESIDENT MAINZER: And I really appreciate that, but I'll just offer one other observation than for others.

You know, certainly that socialization of the need for transmission infrastructure with the broader public and just how critical that is to helping California address the challenges that you described, you know, the incredible temperature and weather volatility that we're experiencing, how disruptive that is, and also being able to contextualize it in terms of the amount of economic development, job growth, and just overarching value for the state I think is really important.

I think also something that I really find valuable about this forum, as well, and something that we

take seriously at the CAISO, we're actually very strong supporters of distributed energy resources. We think that plays an important role in the state's resource portfolio through our Order 2222 Tariff. We're going to want to make sure that those resources can have access to markets, et cetera.

But just the scale of the bulk grid requirement, as you've described, is so monumental that we really need alignment all the way across the state's policy apparatus from top to bottom, that this is necessary.

And we have checks and balances and different control procedures built into the state process. I think those are important, healthy. But the more that we can time them and synchronize and make sure that the oversight mechanisms, the questions about the viability and the necessity of transmission, front load that as much as possible so we don't go through this very, very comprehensive transmission planning process that literally is just a reflection of the state's SB 100 goals and the reliability requirements of the grid, and then finding ourselves second and third guessing that over and over again and just adding more time and more money and more delay into the process.

So the more we can synchronize that and just truly get top-to-bottom policy alignment around the need to

get this infrastructure, the better.

MS. EDDY: That's a really interesting point. If I can jump in on that, this question of the rebuttable presumption when it comes to need determination in the CPCN process does need to get resolved. That chaptered out legislatively last year. It's in a couple of different bills now, including SB420.

To the extent that we can make more efficient the CPCN process, the CEQA process, basically all of these processes, it's going to help tremendously, just to your point.

PRESIDENT MAINZER: Yeah. No. Thank you. That would be all the questions I have this morning. Thanks.

Shannon, thank you for your leadership. We really appreciate the partnership with you and the whole, just the whole universe of stakeholders with so much invested in this process, so thank you.

MS. EDDY: Yeah. Thank you.

COMMISSIONER MONAHAN: Okay, let me pass it to the CPUC and start with Chair Reynolds.

PRESIDENT REYNOLDS: Thank you.

And thanks for the great presentation, Shannon. Really clear and informative. I was wondering if you had thoughts on anything happening at the federal level that we should be thinking about and paying attention to that could

be helpful to California? And it might be kind of a big question, but maybe hone in on, you know, the areas that you think are most important.

MS. EDDY: I think taking advantage of any kind of federal monies that can be available to us and to our transmission build out would be hugely significant and very helpful.

I think also finding some alignment between some of the federal incentive structures and state planning would be pretty useful as well. For example, the IRA outlined new incentives for developers to develop projects in energy communities. The IRS just came out with those energy communities last month. And so to embed those into some of the planning processes, for example, in the RESOLVE model for the IRP, would be very useful.

Those are the kinds of things that I think that we can be leveraging really to the greatest extent. And I know there are a lot of different pieces in the IRA. I don't know how deep you want to go on that.

MS. CALZADA: That's helpful. Thanks.

COMMISSIONER MONAHAN: Vice Chair Gunda?

VICE CHAIR GUNDA: Thank you, Commissioner.

And Shannon, thank you for that excellent presentation.

And David, thanks for setting the stage on both

ends and bringing all the teams together. Because I talk to David all the time, I know what he's thinking.

Shannon, I'm going to direct my question to you at 30,000-foot level. So, you know, you recognize the problem of the incredible amount of new build that is required. But you also talked about, you know, it's not just bulk or DERs or on a rooftop. You know, we need everything on the table; right? And I think I kind of want to expand on President Reynolds' question, and also Elliot's thinking here.

You know, we have near-term, middle-term, and long-term reforms that we could do to accelerate the buildouts. I think some of the processes we are putting in place right now could probably play out really well in the next two to three years; right? So they'll begin to shape.

Are there lessons we can learn from the broader scope of your work in the rest of the country and other balancing areas and in other states? What are some immediate steps we can take to, you know, unlock some of the megawatts or interconnections in the very near-term as we continue to reform and make sure the processes, to your kind of statement, really align with the needs of the future? So I'm kind of just thinking about any short-term things we can do as we're also like thinking about these mid-term and long-term reforms.

MS. EDDY: You know, thanks for the question. I think off the top of my head in terms of on-the-ground short-term reforms, I don't have many. They all would require some sort of legislative fix or regulatory direction.

I do want to give a nod to AB 205 and the AB 205 process. To the extent that the AB 205 process truly does accelerate project siting, that would be fantastic. What we're finding is that that's looked to, even by some counties, as a relief valve on a lot of different levels. And so I think we're all looking at what's happening with Fountain Wind and some of the other upcoming applications that are happening at the Energy Commission to see if that really does provide some efficiencies. And to the extent that it does, that would be important.

I think beyond that, a lot of our recommendations revolve around some of the interconnection process enhancements process and the deliverability process elements that are pretty live at CAISO right now. And it's kind of interesting. I mean, I think one of challenges that CAISO faces and, really, that all of you face is that you're managing messaging coming from multiple developers that are all competitors. And we're doing what we can to give some very streamlined and consistent direction about how to move through the reforms to the interconnection

process as best we can so you don't have to make so many major decisions among competing interests.

But, ultimately, you're going to have to. There will have to be decisions made about site control, site exclusivity, how those things play into prioritization of interconnection to the extent to which we prioritize projects in different zones.

I do want to take an opportunity and just give a nod to what President Reynolds mentioned, which is the fantastic work by the Energy Commission on land use screens and also by the PUC, Jared Ferguson, Erica and Sophia have been doing just amazing work on updating those land use screens, which is even more important now in light of some of this prioritization and also working to embed those, that kind of data, into the busbar mapping. That kind of certainty, that kind of clarity, and also building some transparency into the busbar mapping process with the stakeholders as we go, I think is going to deliver some really good efficiencies that are going to yield good results on the back end.

COMMISSIONER MONAHAN: Alright, thanks to Shannon and David.

I think we're going to move on to our next panel and I'm going to turn it back over to Ben.

MR. WENDER: Thanks so much to the dais.

And again, Shannon, David, wonderful framing and presentation.

Next we have a panel digging in on policy-driven and bulk system planning and highlighting some of the ongoing improvements. I want to turn it to my colleague, Nathan Barcic, who's a Program and Project Supervisor at CPUC, who will start us off.

Take it away, Nathan.

MR. BARCIC: Thanks for that, Ben.

Morning, everyone. Nathan Barcic with CPUC IRP, here to give you a quick intro on some transmission planning concepts to tee up the panel's discussion over the next couple of minutes with the focus on CPUC IRP's process, which is a pretty big cog in the machinery, but obviously not the only cog.

We can advance the slide, please. And one more.

So this chart might be oriented with IRP somewhat near the center of this planning universe, but I assure you that's a coincidence. What we're trying to show with this chart of the CPUC IRP's part of the puzzle is neither the beginning nor the end of the transmission planning process in California, which is actually more of a cycle in a lot of ways. I'll try to walk through it for a second and broadly articulate the flow.

So first you can see CARB setting GHG target

ranges for us. Second and kind of in parallel, CEC develops a load forecast for everyone else to use in their part of the process, and also the SB 100 process provides us visibility out to 2045.

And once we have those things, then IRP can start taking action, and it picks GHG target or targets from within CARB's range. It develops and adopts a portfolio or portfolios for consideration in transmission planning, and it then transmits them to CAISO's TPP. In parallel with that, CPUC might also order procurement of its jurisdictional LSEs.

CAISO, once it has the proposals -- or once it has the portfolios might actually pass info back to CPUC IRP, sometimes in the form of improved transmission assumptions, whether that be capacity or cost, and sometimes to LSEs, which could be information regarding interconnection that might help them in their procurement activities.

The next slide articulates visually the process that we're going to get into, but I'm mostly going to leave Jeff Billinton from CAISO, our next speaker, to describe. I think the main idea here is that in considering what we just covered on the previous slide, with new IEPRs coming every year and new TPP cycles starting every year, IRP does its best kind of in between those two things to build and

transmit the portfolios that are needed for study at the transmission level.

Suffice it to say that when we pass CAISO the information, they engage in some very robust analysis as part of TPP to identify the transmission that we need. And though that part of the process that we're talking about here has historically been focused on a ten-year-out horizon, we recently have leg requirements that require us to go out 15 years, which I think this community, this planning community, is actually quite excited about.

There's also a new MOU between the CAISO, CPUC, and CDC that memorializes part of the process described on the previous slide, and also adds some additional detail about other efforts that we might undertake to get better at this in general.

Each year the PUC focuses on generating a reliability and policy-driven base case portfolio for study in the next TPP. And sometimes we'll also pass one or more policy-driven sensitivities, study other possible futures that may or may not reflect actual realistic futures, but through their study might still tease out important information such as what transmission you might need for a large amount of offshore wind, which is a sensitivity that we just passed back in February.

On the next slide, you'll see bar charts that are

probably pretty familiar at this point for those that have been tracking CPUC IRP. And there's lots of information embedded in this simple chart, but the main message is about the sheer number of megawatts that other people have mentioned so far today in the base case portfolios that CPUC is transmitting to CAISO, and that the number of megawatts keeps growing each year.

So the chart shows the last four TPP base-case portfolios resource builds for mostly the end year of the portfolio. Moving left to right, you move from furthest back in time to most recent. And the two main drivers of the megawatt increases are one, and that assumptions are changing, and so, key drivers under that could be GHG targets getting lower, i.e. IRP is generating and transmitting portfolios that have moved from years ago a 46 million metric ton GHG target by 2030 to most recently a 30 million metric ton one, which logically drives more clean resources into the portfolio.

The other big assumption is changes that loads are getting higher. The assumptions that we've used for load have pivoted towards high electrification in the last year or so, which obviously also drives the need for new clean resources higher.

And the second big reason why you're seeing these increases in the size of the bar as we move further into

time is simply the passage of time. You'll note that on the far left, the year that the portfolio focused on was 2030, and on the far right, it's 2035. And as we move towards our 2045 goals, which are even bigger, it's only logical that more resources are part of the portfolio in each successive year.

How does that relate to this workshop's goal? Well, we need to keep getting better about transmission planning, interconnection, and all the related issues that are kind of in front of us here to get to our goals in a timely and affordable manner.

And then our last slide, we have some detail about CPUC's busbar mapping process, which is a key process that sits between IRP's generation of these portfolios on this slide -- and if you could please advance the slide -- the resource portfolios that CAISO receives.

So busbar mapping is a joint effort between PUC, CEC, and CAISO staff. Its main activity is to refine the geographically kind of course portfolios that are generated by IRP in our model to add more geographic granularity to them by assigning resources to the specific locations on the grid, we call them busbars, you can think of them as substations, in order for CAISO to meaningfully be able to study them in TPP. It focuses on new utility-scale resources.

And the process has been slowly growing and evolving over IRP's lifetime. It's almost six years old now, and there is a detailed methodology doc linked here in the slides in the bottom left that folks can go peruse if they like, which is also accompanied by spreadsheet information that articulates detail about the individual portfolios that we've transmitted CAISO if you're curious.

We aim to continue refining the process with some stakeholder engagement coming a little bit later this spring, so please stay tuned so that we can fine tune what we're doing for the 24-25 TPP, which would culminate in hopefully a decision adopting portfolios for that TPP in Q1 of next year.

That's actually it for my presentation. But for the rest of the panel, I think I'm going to tee up Jeff Billinton, who is Director of Transmission Infrastructure Planning with the California ISO.

Jeff, do you want to flip on?

MR. BILLINTON: Yeah. Thank you, Nathan. Appreciate, as we kind of continue the discussion -- and if you want to go to the next slides, you can go to the next slide -- what we've been talking about and as we're looking at the -- kind of as we look at our transmission planning, the ISO does an annual Transmission Plan that's set out in our tariff. It's a ten-year. We've been looking at

extending beyond to look at some of the needs. As well as Elliot indicated earlier, we issued our first 20-year outlook in May of 2022, and that has been very, very helpful as we're looking at the transmission needs and the escalating of the resources.

And as has been indicated, the strategic direction for this transmission or transformational change in a lot of ways has been helped and established through the Memorandum of Understanding that has been mentioned before. And in a lot of ways, it's identifying and tightening the linkages for the resource planning, and as Nathan indicated, for the resource portfolios, the locational, the busbar, where are the resources that are being planned in the IRP?

And then our transmission planning as to, as we've talked about, moving to and focusing to a zonal approach for that transmission that's needed to enable the resources within the IRP, and those linkages and tying to the interconnection process, which is vital to the discussion today, as well as to the procurement as we look at where are the resources being procured that are aligned with where that transmission is being planned to, and also, like I say, it's been through the interconnection process, that planning of where that transmission is expected or is planned to be developed, setting a stage of where that

interconnection and where place is for the interconnection to enable those resources.

And so that's important, as well as the linkages as we look at the CEC's SB 100 and IEPR activities that we're discussing today, as well as the ISO's planning and interconnection processes and CPAC's processes.

And then the other component that does is it reaffirms the states, as we're looking at the single forecasts, we're looking at the load growth and the escalating of the load growth, and it's being consistent in the planning for the resource and the Transmission Plan. And so that's a vital importance, and as we look at our 2022-2023 Transmission Plan, and as Elliot indicated, in a couple of weeks, we'll be bringing forward to the ISO's board for approval, that includes and kind of encapsulates in taking and moving to that zone of approach.

If you want to go to the next slide, please

As we look at the at the, you know, kind of the climate change goals, it's driving. And the load and the load forecast for the load is increasing. And as you can see in the diagram, kind of the load forecasts increasing based upon the different successive IEPRs that we have forecast that we use in our transmission planning.

The dark green line identifies the forecast that

was adopted in the 2021 IEPR, which is used in the 2022-2023 transmission planning process. But as the CEC evolved the forecast and scenarios, a high transportation electrification forecast scenario was developed, and in a letter from the CEC and CPUC, we shifted to the high transportation electrification forecast within the transmission planning process for the 2022-2023 cycle, and used in that analysis, as well as was used in the sensitivity portfolio that was provided as part of that transmittal for this transmission planning process. And so it's utilizing the principle of the single forecast but seeing the increasing loads as we as we progress.

And then in terms of the weather variant of how we study in different studies that we use, again, that is based upon the CEC's forecast and also encapsulated within that single forecast set within the IEPR documentation.

If you want to move to the next slide?

And this is similar as we look at in the discussions that have been kind of included within Shannon's presentation, as well as Nathan's presentation. And as we look at, in the center, kind of in the transmission planning process, the base portfolio that was provided to the ISO from the CPUC for the 2022-2023 transmission planning process, as well as the sensitivity, which in the ten-year horizon is in the 70 gigawatt and in

the similar to the portfolio for next year in 2035 is around 86 gigawatt.

And so as we're planning, we're planning to the base portfolio that's identified in the transmission planning cycle, but the sensitivity and in particular with that sensitivity being the base portfolio for the next planning cycle, the 2023-2024 planning cycle being the sensitivity, it provided as we looked at the needs that we identify when there's a need within a base portfolio, the alternatives, and so that we're picking and looking at alternatives that will meet the need that's identified within the base, but also future needs that are in the sensitivity and longer term.

And then as you look at, and Shannon also kind of touched on it, as we look at our 20-year outlook, and that had around 120 gigawatt by 2040, looking at alternatives that will meet the needs that's identified within that base portfolio, but those alternatives also be reviewed and selected as we've identified to meet those longer term goals in the resource development.

If you want to go to the next slide?

This is kind of highlighting, and Shannon identified this diagram, as well, on the right, which is as we look at the zones and where's the portfolio, the diagram on the right -- or on the left, I mean, identifies from the

20-year outlook where the resources were being located, were kind of located within the scenario that was developed as part of the SB 100 starting point scenario for the 20-year outlook.

And that -- (clears throat) excuse me -- that then identified, and as you can see with the dotted lines, where there's the need for transmission development within that 20 years to meet that 20-year outlook resource, as well as load as we looked at those areas. And in there, also looked at a gas retirement of approximately 15 gigawatt. And in the local areas, in particular with those impacts in the 2022-2023 Transmission Plan, as we move to the zonal and the approach of where the resources are.

And this map identifies and highlights within the base portfolio where the resources are located, as well as within the sensitivity, which is very similar to as I indicated in the transmission planning for the next year's planning cycle, as to the base portfolio.

And so this highlights as to, as we look at these areas, what transmission in the Transmission Plan reflects, looking at what transmission is needed so as to be able to access the resources and have the resources deliverable and be able to interconnect into the system to meet the state's goals and also reliably for the system as we move forward.

And so this is as large as we look at it in terms

of planning the transmission to accommodate the resources within these areas. And it also then sends the signals as to within the interconnection, where are we planning the transmission and how much are we planning the transmission system for to accommodate the resources in those various areas as we go forward, which then as we look at then for once the resources in the interconnection, where they should be procured so as to be deliverable to the system.

And so that's a large as we shifted in the 2022 transmission planning process and highlights in the transmission that is incorporated, as Elliot indicated, into the Transmission Plan that we'll be bringing to the Board in May for approval from that point of view.

So I think from that point of view, that covers my presentation of kind of how we're moving forward in the planning to meet the loads as well as the resource based on the climate goals of the state.

Nathan, I'll turn it back to you.

MR. BARCIC: Great, thanks for that Jeff.

I think for the next part of the panel, we have Jason Rondou from LADWP where he's Director of Power System and Planning.

Jason, do you want to flip on?

MR. RONDOU: Yeah, Nathan. Do you hear me okay?

MR. BARCIC: We do.

MR. RONDOU: Alright. Great. So, yeah, thank you for inviting me to present here. I'm Director of Planning at Los Angeles Department of Water and Power. And I want to share a little bit about our planning process and what we are doing now to try to have that match what the challenge is in front of us. So let's jump into it.

On the first slide is a summary of our Strategic Long-Term Resource Plan, which many of you are aware we used to refer to as our Integrated Resource Plan and we perform this each year, where we determine the resources that are needed for us to meet our goals, whether it's related to reliability or our renewable energy or distributed resources.

Over the course of the last several years we paused that Strategic Long-Term Resource Plan to conduct the LA100 Study, on the next slide, which was much more robust in scope and included both resource and transmission planning and looked at air quality, as well as jobs and everything related to our decarbonized future so that we can understand the different pathways to reach 100 percent renewable energy and we understood what those trade-offs were.

That study was concluded in 2021 and it came to a pretty significant conclusion that no matter what our strategy is to get to 100 percent renewable energy, and

when I say renewable energy what I mean for, you know, purposes of clarity is a carbon-free energy. The terminology that the study used was renewable as the Department of Energy uses it, but what I'm referring to is carbon-free energy.

And so what the study found, among many other findings, was that no matter how we get there, there are common areas of investment and one of those is transmission. Even under scenarios where we maximize local resources, maximize local rooftops, solar, local storage, demand response, managed charging and all of the different local resources that we could maximize, we still need to grow our transmission resource.

And that's a significant finding in and of itself but it's even more significant when you understand that Los Angeles is about 10 percent of the state's load but we have about 25 percent of the state's transmission capacity. So even with LAWP having a rich transmission resource we still need to grow our transmission investments even under scenarios where we have a strategy that maximizes local resources.

So I wanted to emphasize that point because it not only has relevance obviously for LADWP but for other utilities that may not have as much of a rich transmission resource that we have.

So following the study, we embarked on our updated Strategic Long-Term Resource Plan. So the LA100 Study did not recommend a pathway, so our staff took that and built upon the LA100 Study -- on the next slide -- to determine what is our recommended pathway to reach 100 percent carbon-free, and that included an interim target of 80 percent renewables by 2030. It is a significant build rate of resources of 1,100 megawatts per year.

By comparison over the last several years we have incorporated about 200 megawatts a year. So we're talking about a five-fold increase in capacity being brought online over the next 20 plus years. That means all the capacity that LADWP has today, all the coal that remains to be decommissioned in 2025, the natural gas which will be the utilization of that will be dramatically reduced, all the wind and solar and storage that we have, all of that would need to be more than doubled. That includes a really significant continued build out of distributed resources.

We'll move on to the next slide.

So with that study, the LA100 Study, and with our Power Plan comes the reality of implementation challenges. I'll touch on the one that's highlighted in the red box last, and I just want to briefly touch on the remaining ones and then I'll circle back to that one.

We obviously need to maintain a reliable system

for the reliability of the grid but also for the leadership that we view LADWP being in with respect to the decarbonization of transportation and buildings. So to do that effectively we need to maintain a reliable and resilient system.

And we also want to make sure that rates are designed in a way that is affordable and equitable to all customers in the city of L.A., the availability of technology of, you know, things like, you know, technology that needs to be rapidly mature for us to be able to incorporate that into our system, things that may be many years out such as green hydrogen. And then, essentially, building out all of the distribution system that needs to be built out to be able to support that growing load.

Now that gets us back to the implementation feasibility, so we need to incorporate a significant amount of new staff to be able to execute on this. We also need to understand the supply chain risks. And that has to do, in part, with procuring renewable energy.

And there are a lot of moving dynamics right now in that industry, as all of us know, with interest rates, with supply chain questions, with the cost of materials and so on, and with the uncertainty in the market just generally. And there's a lot of new things, including the Inflation Reduction Act which also has caused a number of

proposers to refresh their proposals.

And so all that means is that in addition to the challenge of incorporating all of these resources, we also have a lot of volatility in the market as well.

One of the things that I'll touch on before we move to the next slide is the implementation feasibility of getting all of the transmission resources that we need to get in order to reach that 80 percent goal by 2030. What we have identified is a list of about 20 -- sorry 34 transmission upgrades primarily within or near the city of Los Angeles to be able to get that power where it needs to go.

Under current conditions in terms of the permitting processes, if you look at our recent history and how long it's taken us to deploy transmission projects of the similar size that we will need to see, we don't believe under status quo permitting framework and status quo agency coordination that we will be able to get all of these transmission projects done in order to meet that interim goal of 80 percent by 2030.

So I don't think that will come as any surprise to anybody here. As we all know, there are many efforts to streamline that and to make the development quicker and easier and more predictable. And predictability is incredibly important for us, especially when you factor in

the outage coordination that is required for us with so many moving parts, bringing transmission lines out of service, incorporating local resources and that sort of thing. The sequencing of those outages is really important for us not just to have transmission line development happen fast but also predictably so that we can build out an outage schedule that is not subject to rapid change all the time.

So on the next slide touches on our transmission planning overview. I'm not going to get too into depth here because I think many of you all know that and I think the slide speaks for itself. But what I will say is with respect to the relationship of our transmission planning and our resource planning, it is an iterative process. So when we update our Power Plan, we build out a ten-year Transmission Plan to make sure that we understand the different resources that are required to achieve that.

What we need to do is rethink that to make sure that our resource planning and our transmission planning are happening simultaneously. And we also need to look at the feasibility of doing that on a one-year cycle. That is incredibly difficult to do, so we're currently re-evaluating the different cycles that we have internally here.

On the next slide you can see one of the major

challenges that LADWP has. I'm actually going to skip over this slide in the interest of time because I've touched on a lot of this already with the relationship. But one of the challenges that we have, and everybody else has touched on this already, is the transmission planning process that we have now is reactive to our Resource Plan but it doesn't strategically identify where the different resources are that we may need.

One example of that is we know we need a significant amount of geothermal resources but with our existing transmission capacity we may not be able to reach all of those, which is not a problem that doesn't have a solution but it may not be an optimal solution for us, so that is a consideration for us with respect to the transmission planning going forward.

On the next slide I'll highlight an issue that we also are struggling with which is identifying how we can mitigate against resiliency risk. On the next slide you'll see the representation of the transmission corridors that come into the city of Los Angeles primarily on the northern portion of the city of Los Angeles where we have the risk of things like wildfires with the Saddle Ridge Fire and the Sayre Fire ten years earlier, the Northridge Earthquake. So when we look at transmission planning we not only need to figure out how to get the power to the parts of the city

that need to get it, but we also need to look at potential new corridors into the city that could bolster our resiliency going forward.

On the next slide we are looking at different ways to modernize our transmission planning processes. On the next slide you'll see some of the challenges that we have dealt with. Currently we're using a serial first come, first served. And I think none of these challenges will be a surprise to any of you, so we'll move on to the next slide which talks about our approach to moving towards first come -- first ready, for served. We expect to have that cluster approach in place starting spring of 2024.

On the next slide it touches on our strategic Transmission Plan which builds upon our ten-year Transmission Plan and addresses some of that reactive interaction between our Resource Plan and our Transmission Plan and this is an effort to figure out how to solve the issues around resiliency and solve the issues about transmission reach to the resources that we need. And so this builds on our transmission planning effort that used to be a 10-year horizon and now will be, in addition to that, a 20-year horizon as well.

And what this has allowed us to do is have a much more intentional collaboration dialogue with CAISO to look at opportunities for partnership on potential new corridors

going forward.

On the last slide we touch on a couple of the collaboration efforts that I just mentioned with CAISO, in addition to some collaboration opportunities with the Department of Energy as well.

So that is my last slide and happy to answer questions.

MR. BARCIC: Thanks for that, Jason.

I think at this juncture we'll have a quick discussion and then pass things back to the dais.

I think maybe in summary what I can say is that, consistent with the theme of this morning's remarks, especially from Commissioner and Chair level, there's a lot of opportunity out there, but there's also a lot of challenges and a lot of opportunities for coordination and improvement.

I think a couple of the ones that I'd highlight would be lead time to get resources online and the horizons that we're looking at. I showed a slide a couple minutes ago that showed not too long ago us planning for 2030 in TPP and the portfolio that we're going to pass for '24-25 TPP has to at least focus on 2039, and maybe why not round up to 2040 for that?

We've also mentioned on IRP some mapping refinements that we would like to do. Currently we take

into account things like distance to transmission with appropriate voltage, known transmission capacity limits, land use, environmental screens, commercial interest, and then with our battery mapping proximity to disadvantaged communities but is that the right list? Is it a long enough list? More not certain.

And then Jeff or Jason, I don't know if you want to chime in with any other any other opportunities here in a second? But the last one I'll highlight is that I think I kind of discerned from Shannon's remarks earlier of what level of directiveness from regulators is appropriate for actually getting the right things on the electric system, especially transmission system, at the right time and in the right place?

We have a very large amount of procurement, if I'm just speaking from what our LSEs are doing in response to IRP requirements, going online right now to meet our near- and mid-term reliability orders and doing so in a relatively orderly fashion. But I think during that process we're all learning that that fashion could probably be improved and some refinements are probably due.

So Jeff, Jason, do either of you have quick reflections on that before we pass back to the dais?

MR. BILLINTON: Yeah. No, it's true. I think we've touched on it, and I think Jason touched on it as

well, where we're looking is where are the resources, and basically needing to look where are we planning the resources to meet the goals, and so that we're planning the transmission so as to enable or open up the system so as to be able to interconnect those resources in the timely and in the needs to meet those goals as well as the reliability needs of the system.

And so I think as you've touched on in the refining of the busbar mapping within the IRP process and us then moving to that, to kind of the zonal approach to the transmission to meet, that then moves, like I say as in the discussion later, as to the interconnection and sending the signals where the transmission is being planned for those resources, and then as such leading the LSE procurement.

So I think that's important, and I think Jason also touched on that, is that's important initial steps to get moving forward in this fashion.

MR. RONDOU: Yeah, I think without restating, you know, what some of the potential solutions are, I think just underscoring what's at stake is probably important. And I had mentioned, you know, meeting interim goals is one thing. We talked about 80 percent by 2030 and being able to bring all of that power not just to the city but the parts of the city of Los Angeles that power needs to flow

to.

We did look at a scenario where we had even higher renewable compliance by 2030 which is 90 percent. And we found that due to increased gas prices and reduced renewable prices that the cost to ratepayers of 80 percent versus 90 percent is the same. So why wouldn't we? Why wouldn’t we try to achieve 90 percent? And the answer is we think even getting the transmission for 80 percent will be a challenge. We can't sign contracts for 90 percent and be bound to those contracts and then not be able to get the transmission home.

So the reason that, you know, higher levels of interim compliance with renewable goals is a challenge is because of the issue that we're here to talk about today. So I just wanted to underscore that, that that 80 percent versus 90 percent was roughly the same cost. And we can't get there simply because we can't get the transmission resources deployed fast enough to be able to get that energy where it needs to go.

MR. BARCIC: Great points, both of you.

I think at this juncture we can pass things back to Commissioner Monahan to see if there's any reflections from the dais.

COMMISSIONER MONAHAN: Thanks. And I encourage my other dais participants to hop on, whether or not you

have a question. And then if you can raise your hand if you have a question. And I know Commissioner McAllister didn't get an opportunity last time so I'm going to prioritize you if you have any questions, and Commissioner Douglas as well.

So if you have questions raise your hand. If you don't, I'm going to take the prerogative and ask one.

COMMISSIONER MCALLISTER: Go ahead, Commissioner Monahan.

COMMISSIONER MONAHAN: Well, I'm curious about this coordination aspect and how it varies if you're a POU versus an IOU and whether that coordination with CAISO is any different. Are there any thoughts on how planning is different, whether it's easier, whether it's harder, just on the IOU and POU side?

MR. BARCIC: Jason do you want to take a stab from your --

MR. RONDOU: Yeah, I think I'll start. I think if you asked that question a couple years ago we probably wouldn't have a strong answer about what that coordination would look like and what those opportunities are. But I think what we did over the last several years is we built upon our ten-year Transmission Plan and started to think a lot more strategically with our Strategic Transmission Plan to identify where we need to reach the different parts of

the region to be able to access those renewable resources.

Now having CAISO's Transmission Plan and our strategic Transmission Plan, now we can start to understand each other's needs and now we can start to intentionally have good dialogue on where those opportunities may lie. And that has happened now over the course of the last year or so thanks to the leadership of our transmission planning folks in really taking that leap to bring us, you know, much beyond ten years.

COMMISSIONER MONAHAN: Great. Thank you.

I'm going to pass it to Commissioner McAllister.

COMMISSIONER MCALLISTER: Well, thank you, Commissioner Monahan. Your question sort of got at what I'm wanting to ask, which is, you know, just acknowledging the tremendous progress that's been made at the longer time horizons, the kind of socialization of where the best resources are, where the areas of priority kind of should shake out. And I guess, you know, obviously, historically, the entities responsible for their own planning have kind of had closely held boundaries and they kind of, you know, owned the playing field within those boundaries.

But as we try to open up towards broader geographies and coordinate across those, and let's just sort of talk about LADWP and CAISO, but we have, you know, BANC(phonetic) and surrounding areas outside of California,

how much consensus would you say there is about the resources and therefore the transmission planning kind of pathways that are or will, you know, have bubbled or will bubble up to the top? Sort of trying to understand the process, trying to begin to conceive of a process that can embrace any sort of resolve -- embrace and resolve any differences of opinion as we get to larger scale and broader sort of macro planning.

MR. BILLINTON: Well, it's Jeff here and I can touch on it at first. And that's one of the advantages, I think, as we look at the need for some of that longer-term planning and the looking out longer in our 20 year outlook, as well as Jason has indicated, they're looking at longer in the forecasts and portfolios within California in particular.

And in those portfolios, we're identifying resources that are outside of the state of California. And we've been looking at that kind of some different models being it of the subscriber PTO model with the TransWest Express, with SunZia, and also as we continue to look at LS power for the SWIP North line and engaging in looking at innovative identified roles. So having discussions with Idaho (phonetic) Power to what are their needs with regards to that transmission.

And then within the state ourselves, coordinating

with LADWP, as we've talked about, with one project that has been identified that we're looking at from either a timing or of a need for that project with potential gas retirement and those as we look at it, but discussions and projects that L.A. is identifying within their -- LADWP is identifying in there is how do we coordinate and collaborate so that we're effectively planning the development of transmission that can meet, basically, our needs, their needs, and in essence, then the state's needs?

So those are things that we're looking in as we go forward. We do have our interregional transmission planning process as well. Unfortunately, there is some limitations or issues in that it hasn't moved forward with transmission within those areas where we continue to coordinate with the entities outside the state, as well, as we look at those long-term needs.

COMMISSIONER MCALLISTER: Thanks a lot. I guess I'm just trying to understand, as we get to that bigger scale, where the pain points are or are likely to be and sort of look forward to how we as, you know, as we manage this conversation with our colleagues on these broader geographies, can we sort of keep on the same page and really resolve any remaining conflicts, potential conflict?

MR. BILLINTON: Yeah, and that's through the coordinated discussions and engaging with those parties, as

well as like you say, the portfolios themselves indicating the need for, and it's a lot with the diversity of the portfolio, the need for resources and the locations providing that diversity and having to ensure that we're engaging the entities external as well.

COMMISSIONER MCALLISTER: Great, thanks a lot. And anybody else want to chime in. Thanks for that.

MR. RONDOU: Yeah, I would just add that simply the publication of our Strategic Long-Term Resource Plan shows what resources we need, it doesn't identify where those resources are. And I think there's probably, you know, rough consensus on where the resources are. But understanding our mutual needs and identifying where we think that the transmission reach will go, again, allows each of us to understand what our mutual needs are.

Now there may be some upgrades where, you know, there might be a sole benefit to LADWP and not much to CAISO, but there's going to be others where there is benefit. One example of that could be reaching offshore wind and figuring out how to bring some of that energy to all parts of California, where a project where LADWP might look at that and say, oh, you know, could we build a new transmission project to be able to reach that, it may not make financial sense for us to do that alone.

And if the state has the need for that in the

Southern California area, then that's one example where we would work together and have that dialogue to figure out when the timing of when we would need it, how much capacity would be needed, and could we actually scope out a project that would make sense.

So that's an example of one where I think there could be a significant mutual benefit.

COMMISSIONER MONAHAN: Excuse my sneezing.

Let me pass it to Commissioner Douglas for her question.

COMMISSIONER DOUGLAS: Thank you, Commissioner Monahan.

First, I want to acknowledge, as Commissioner McAllister did, the tremendous progress in this space and just how far we have come in our ability to match the resource planning and transmission planning and policy goals and reliability needs of the state, and to look further out over the horizon as is absolutely necessary for what we're trying to do.

I guess my question is, you know, just as we try to see around the corner towards what's the next set of real possibilities and where else do we need to really improve in our coordination and our process, I'm struck by the conversation, which I think is great, about where we can find transmission lines with mutual benefit and create

partnerships and enable transmission to be built that might not make sense for someone in isolation but might make sense as a joint venture.

And I guess I wanted to ask the question of, you know, sort of where and how are some of those opportunities being vetted? And to what degree are you, when you vet those opportunities, kind of able to bring in some of the broader picture, you know, the offshore wind getting to the L.A. Basin and how does that impact how long certain gas plants are needed, or kind of the resource type/resource quality that could be accessed?

MR. BILLINTON: Well, it's Jeff here. I can maybe start, and someone can touch, also, Jason can, or even Nathan from the point of the IRP process.

But I think getting those Resource Plans and the longer term as we look at them for what our needs are -- because the transmission solutions for some of those longer term and escalating needs get longer. And so as we work through those, how do we identify what the resources we're looking for, L.A. is looking for or BANC or -- and then what are we looking at for solutions and coordinating?

And I think some of it can also coordinate through and has kind of in the SB 100 approach, as well, looking at that longer term and how do we bring together the plans? And are there areas that there is that, and I

won't say overlap, but areas where there is potential for and ensuring that we're exploring those?

And as we've been working with Jason and collaboratively as communicating so that we're aware of and what are they looking at, what are we looking at and that those plans fit into that longer term. And if there's needs, like you say, because the permitting and siting and routing is a challenge, and how do we maximize the utilization of greater ways for the common, if there is an opportunity where there is a kind of a joint need?

MR. RONDOU: Yeah, I would just add quickly, part of this question about what will that mean for gas utilization is clear and part of it is unclear. What is clear is that no matter what the transmission upgrades are that are required, as they get built, whether they're upgrades to existing transmission infrastructure or their new corridors that might have partnerships with multiple utilities, as those get built, gas utilization comes down dramatically. We forecasted that the capacity factors in-basin gas plants by 2035 would be in the low single digits. So, you know, one, two, three percent of the time they would be relied upon for extreme cases.

Now, what the LA100 Study found is that under all of those scenarios, we still would need some long duration capacity within the city. And what isn't entirely clear is

to what degree major new corridors would have us reevaluate what amount of capacity would be required. That's important for us to understand at some point because what that means is building new potential capacity beyond 2035 and beyond 2045 needs to be coupled with a decarbonized vision of that. And a decarbonized vision of that, you start to talk about things like biofuels or green hydrogen, and that's where you have a significant amount of technology risk.

But what we do know is that in the future, no matter what it is, whether it's in-basin, you know, City of Los Angeles transmission upgrades, or if there are new corridors, that allows us to rapidly back down the utilization of those plants.

MR. BARCIC: And just to echo Jason and LADWP's experience with their IRP and those gas findings, CPUC IRP finds very similar things. The further out in the time horizon you go, often our cases are retaining the gas instead of running it way less. And so what does that mean for, you know, the sorts of reliability questions, but also policy questions that the state's grappling with? And do we need to examine our own tools across the planning community to figure out, is there a way to thread the needle to plan for a future where policy goals don't accidentally trump reliability goals, so to speak?

COMMISSIONER DOUGLAS: Thank you.

MR. RONDOU: Sorry, Nathan. You brought up such an important point that I feel really needs to be underscored, which we've got really robust planning processes and ways to approach things like reliability and decarbonization. And one thing that I think needs to be contemplated a lot more is how we quantify resiliency and how we approach that. And the reason that I think that's so important is because, again, you know, without planning -- you know, right now it's done, in some ways, a little bit qualitatively. You know, to what degree do we have risk of wildfires, earthquakes, and other unplanned events? But the reason it's so important now is what's at stake is not just the decarbonization of the grid, but the facilitating of the transportation and building sectors? And if we sacrifice resilience along the way, what type of headwind does that create the decarbonization of those other sectors?

And so I wish I had a perfect answer, except to say, we really need to figure out how we approach resiliency. And the way that we've approached it, is we said under certain scenarios, if we lost major transmission corridors for extended periods of time, what resources would we need to have to make sure that we maintained reliability? They wouldn't be used very often, but what

would those have to be? We may need to reflect on is that, you know, do we need to have a more formal approach where, you know, there's consistency across the state in how we approach resiliency?

So I just wanted to -- sorry to jump back in, but I felt like that point really needed to be made.

COMMISSIONER DOUGLAS: Well, and it's --

MR. BILLINTON: And I'll just add one. I'll just add one because it was there was the resiliency and that's an important and in our planning the wildfire, in our last transmission planning process, started that analysis to look at the resiliency and impacts of wildfire on the bulk grid in particular.

COMMISSIONER MONAHAN: Well, this is a perfect time for our Vice Chair to step in with his questions since he's our point for resilience and planning.

VICE CHAIR GUNDA: Thank you. I think, actually, the questions that, you know, Commissioner McAllister and Commissioner Douglas kind of raised kind of goes to the point, but wanted to just kind of maybe see if you have a quick answer here.

So first wanted to thank Commissioner Douglas on the help that she provided in kind of articulating and capturing the 20-year Transmission Plan along with CAISO, so just a big thanks on that.

But, you know, I just want to extend on the process of synchronization across the different BAs (phonetic) in California. And I think that's kind of like an underlying dialogue here, which is I think there are some organic conversations happening and some processes in place to help us understand, you know, how we can do transmission planning in a coordinated fashion, understanding our resource plans.

And maybe Jason or Jeff, if you could just comment on, how are we thinking all California; right? Like and how are we, you know, connecting with other California in a balancing areas?

But also, and I'm just thinking about the 30,000-foot level, we have a resource base today in California, and we have a transmission base here in California. Do we have venues where we are capturing collectively our goals in a more detailed fashion; right? I mean, SB 100 does not give you a granular level of ability to understand whether we have the necessary power flow between, you might say, oh yeah, we have this resources.

So are there venues, is there a need for us to have better coordination on understanding how, with the policy goals in mind, we use the existing fleet to allow for the transition, not just for any one BA, but California as a whole?

MR. BILLINTON: I think right now a lot of that is, is as we have our transmission planning process, it's open and transparent and information of identifying our needs and the portfolio. And similar to L.A., where they've come out, I wouldn't say there's the formal other than right now within the SB 100, but there is a collaborative of ourselves having regular discussions as we look at it, and especially as our plans and needs become kind of public in awareness.

And then as Jason indicated, and there's the opportunities for collaboration when we understand what the needs of the other areas are. And I think that's important, is we need to identify what is the needs and the resources, like the IRP, which is public, and where they're located. How does that align with the other agencies? And is there opportunities to collaborate?

A lot of that, like you said, is we're doing with regular and consistent discussions between, but is there, other than SB 100, other forums? Not right now, I don't believe, from an internal in California only.

MR. RONDOU: Yeah, I see it's, you know, in some ways the irony of this is that in past years it was very easy for us, for LADWP, to develop our Power Plans and then have a Transmission Plan that supports that, and then the next year to Power Plan, and ensuring that those two are in

sync. And that worked under incremental change.

But as we talk about more rapid change, that iterative process means that we lose a year each time that we do that. And it also means that we're not intentionally looking, you know, two decades out, which means that we, LADWP, we need to reevaluate how we internally synchronize those two efforts, which then means that the synchronization with the state, you know, is going to have to be that much more important. And we'll say that there will certainly be an opportunity to do that.

One benefit is that we historically have done a Power Plan every single year, which has allowed us to, you know, be able to, you know, collaborate a little bit more clearer.

But as that complexity grows and it's not just, you know, the complexity of our transmission planning, but also our resource planning and understanding what our choices mean for air quality and for not just rates but what does it mean for energy burden as customers switch off gas and gasoline and natural gas and so on, all of that adds to the sophistication and the complexity of our power planning, which just means that synchronization is going to be, you know, even potentially more challenging. But as Jeff mentioned, the dialogue is there and the opportunities for synchronization is there.

One key difference for LADWP is that we may have a little bit more flexibility with respect to our power planning because our ability to bring items to our Board of Commissioners and to City Council and so on. So we may have -- and that's not sort of the rigid three-year process. That gives us a little bit more flexibility to tailor our planning around other potential internal and external forces.

COMMISSIONER MONAHAN: Well, I want to thank this panel for their great contributions.

And Jason, I think you summed it up well in terms of like what we need to plan for is rapid change, where we have systems that have been sort of planning for sort of like less rapid or, you know, declining load. Now we're talking about rapidly accelerating load. So that is our challenge before us.

So let me pass it back to Ben, who's going to kick us off to the next panel.

MR. WENDER: Just echo my sincere thanks.

We're going to zoom in a little more specifically now really on interconnection processes. Let me introduce Neil Millar. He's Vice President of Transmission Planning and Infrastructure at the California ISO, and looking forward to this panel.

Thanks, Neil. Take it away.

MR. MILLAR: Okay. Thank you very much, Ben.

First, if we could just move to the next slide, please? Yes.

I'm Neil Millar with the ISO. I was going to walk through some higher level issues that we're taking on at the ISO, and then we'll be introducing panelists from the three utilities to talk about their own activities.

So just to kick it off, next slide, please.

Building on the comments you've already heard this morning, both from President Reynolds, Elliot Mainzer, as well as Shannon Eddy and Jeff Billinton, we are looking at relatively transformational changes in our interconnection process that key off of and are coordinated with the other major processes that all involve leading up to what actually gets built.

And for us on the interconnection process side, that clearly means tightening the linkages between the resource planning, the transmission planning, and having those activities shape, not only where we're prioritizing our resources on our interconnection processing efforts, as well as seeing and encouraging that the load serving entities own procurement activities are also prioritizing those key areas and zones.

So we do have stakeholder process now underway to make these broader changes to our interconnection process,

keying off of the strategic direction that was established with Public Utilities Commission and the Energy Commission. And those were really set out in that Memorandum of Understanding that you've heard about before that was signed in December, 2022.

It did touch on other areas, including formalizing the linkages between the Energy Commission's longer-term planning work and the more instant processes, as well as reaffirming the state agency commitments around single-forecast set coordination. But the ones we're really keying off of and that are most relevant today really focus on those tightening of linkages with the zonal approach that Jeff referred to in our Transmission Plan, based off of the resource planning coordinated with the state agencies, and having that shape how we move forward in our interconnection processes and interconnection activities.

It really calls on us to prioritize those energy-rich zones that are being targeted in the state planning processes, as well as managing the volumes of intake, the number of projects that we study within those zones, and the need to get back to more reasonable volumes that can provide actionable information, allowing resources to move forward.

We also see that we have to address the large

volume of projects that are already in our queue, and many of our past processes allowed projects to get into the interconnection queue and perhaps linger while they may not be as viable as other projects that are coming along later. So that's another area that we know we have to address.

And as I said, this interconnection work then has to be taken to the next step of actually being used to help shape the procurement activities by the many load-serving entities that are ultimately responsible for getting resources under contract that is a key element to them moving forward.

Some of the material I'll touch on next just reinforces why these changes were necessary. I'll draw a finer point on some of the material you may have already heard of or you may have already heard earlier this morning.

So if I could move to the next slide? Thank you.

In terms of the volume of resources that actually need to be built and moved through, you know, referring back to some of Jeff's material, we're talking about volumes being required in the next year's Transmission Plan of over 7,000 megawatts a year of installed capacity to be added to the grid each year for the foreseeable future. This does have us on the trajectory to get to the 20-year outlook portfolios that were established. So we see we're

on the right trajectory or a solid trajectory being established.

Now over the last two years, we've been adding on average about 4,000 megawatts or just over 4,000 megawatts average of new installed capacity each year. But the challenge, of course, is ramping that up to over 7,000 that's needed to meet the state's long-term goals. Now this year is a bit of an anomaly where we're currently on schedule, still at this point, to add over 7,000 megawatts in 2023. But the challenge would be to maintain that pace year over year, which our current processes were not designed around.

If I can move to the next page, please?

And just reinforcing that point, this graph shows how the need for us to prioritize precious planning and engineering resources, responding to the higher requirements of generation being expected in the future, the volume of new interconnection requests is also skyrocketed. That started in 2021 with the Cluster 14 April interconnection window generating 373 applications, which was more than double the highest ever previous number. And of course, that even now pales compared to the 541 completed applications that came in just a few weeks ago, which in total installed capacity represent 354 additional gigawatts. Now that's in addition to the 180

gigawatts of capacity already in our queue.

So this level of resource application interest clearly overwhelms our current study processes. Even if we're capable of producing the results, the usefulness of some of those results when you're studying such a huge volume, it's clearly inefficient and provides less meaningful study results. So this clearly calls on the need for us to take action and move forward with more substantive transformative changes, better prioritizing where we're putting our energies.

If I could move to the next slide, please?

So just to wrap up, and before I introduce the panelists, we do see that introducing the challenges of managing increased resource requirement and the volume of competitive interest in meeting those needs really requires action across the spectrum, both the transformational changes I was describing, as well as collaboration across the entire spectrum of planning, procurement, and resource and transmission planning. We see those tighter linkages being critical across those four major processes.

Of course, we also see transmission project execution being critical, and that includes the streamlined permitting processes. Now these also require reviewing all of our existing processes to maximize new resource interconnection, ensuring that it's done efficiently, cost-

effectively, and also reliably. And that's a key aspect here that in the race to get new resources connected, we must also ensure that reliability is maintained and that the resources can be called upon when we need them.

So that wraps up my introductory slides for the panel. I would now like to turn it over first to Dana Cabbell, Director of Transmission System Planning and Strategy, and Allison Auld-Hill, who's from Southern California Edison, who will now walk through their material.

Dana?

MS. CABBELL: Great. Thank you, Neil, and good morning, everyone. Glad to be here.

So if we can move to the next slide?

So the first slide here really gives the high-level overview of the whole interconnection process. And I'm sure my other panelists will have similar type of slides, too, to kind of lay the foundation and the framework.

As we go through when the utilities receive the applications, you know, the intake, as we process and review those applications to ensure that they're complete. And then, you know, it moves forward into more of the scoping meetings when we meet with the interconnection customer to ensure that they understand kind of some of the

challenges, maybe, where they're wanting to interconnect and really finalize their interconnection requests. And then, of course, we move into technical studies and interconnection agreement, and then finally, project construction and implementation.

You know, as you can see, as you add up the months that we've added there, I mean, this is a from application to online date, it is -- you know, it could be a five- to six-year process. So clearly, trying to streamline this process and improve upon some challenges are going to be very key as we move forward, trying to add the seven gigawatts of resources a year.

So if you can move to the next slide?

It was important to kind of go through that interconnection process, because I want to use it as a backdrop as we start talking about some of the hurdles and the delays, some of these opportunities that we see that we need, too, as we move forward into streamlining and improving these processes.

You know, the timelines for the initial intake and study processes are generally governed by tariff study timelines, as I'm sure you're all aware of. And as you're all aware of, too, the whole cluster process does include this intake and scoping phase, a Phase I study and a Phase II study, you know, with the opportunities for customers to

withdraw between each of these phases.

You know, SCE, we've observed that projects that withdraw early in the process tend to have significant costs or time duration associated with the necessary upgrades to interconnect their resource, their project, or the project just does not receive full deliverability from the ISO or a PPA contract.

With the interconnection agreement, the time spent developing the interconnection agreement is really highly variable. A highly motivated customer may enter into a letter agreement after a Phase I study so that SCE can begin engineering and procurement and then promptly replace that with the interconnection agreement after phase two studies. Another project may intentionally delay their project to seek deliverability in the next cycle or wait on a Power Purchase Agreement before proceeding.

When we look at project implementation, it varies significantly also, both in scope of upgrades needed and the hurdles that come through the execution. You know, what we've seen is both SCE and our interconnecting customers can experience a variety of challenges in design, more recently procurement of equipment, and construction going through the permitting and licensing that needs to happen. This also includes the difficulty in receiving materials, doing all the line crossings that might have to

occur, and coordinating all the outages and other activities.

You know, here at Edison, you know, we've had challenges with delays for projects interconnecting to some legacy, what we call remedial action schemes, or RAS, and to our new centralized RAS, or CRAS as you might hear, which is an automated monitoring and tripping protection scheme designed to enable reliable interconnection of more projects and megawatts that would normally otherwise be allowed. And CRAS is the SCE updated version of the RAS that is more modern and flexible.

RAS and CRAS can be quite complicated and require specialized design and testing personnel. So we've seen some trying to make some real improvements in this area to bring on more of the specialized skills to be able to design and test this, and also make sure that we have the equipment to be able to provide this mitigation and be able to interconnect the megawatts that we need to connect.

If you go to the next slide?

What I wanted to show here are some recent trends. And I think it kind of builds upon what Neil just shared, also, and what I believe has been shared previously, that what we've been seeing as projects coming into the queue. And as everybody recognizes and sees, there's significant amount of requests or the recent years.

You know, with Neil sharing the most recent number with QC 15, that's just, it's from my perspective, pretty mind boggling on how we're going to be able to really run the studies that we need to run and understand where, what is needed on the grid to be able to integrate those resources in these cluster studies.

So, you know, the impact of number of projects and total megawatts on the system, these projects also gradually increase, have been increasing in average size. Overall, this leads to studies that need to be incorporated amount of generation into the Edison system. And I'm sure the other, PG&E and San Diego, are feeling the same. That is much higher than our annual peak load, especially when considering existing and previous queue generation.

This all leads to a lot of uncertainty in which upgrades will ultimately be needed, and when? This is a key reason that Edison has supported the whole interconnection reforms that the ISO has laid out in their interconnection process enhancements.

Another trend has been towards battery-only and hybrid projects. In the most recent published Cluster 14, only a small minority of projects do not include some form of energy storage, which is great because that's going to help with the reliability of the grid. However, having energy storage in the mix is a little more complicated and

creates more complexity in the study work that we need to do.

Cluster projects have the opportunity to finance area delivery network upgrades, which are upgrades to relieve the area deliverability constraints. SCE develops scope estimates for these mitigations every year after the Phase I as part of the Phase I studies. But there has been a consistent lack of customers that select this option to be able to, you know, select the option to build and support those deliverability upgrades.

For projects that have come in service recently, as I mentioned previously for the Transmission Owner Tariff interconnection applications, it has been taking a little over six years. For WDAT, that's a Wholesale Distribution Access Tariff, it's about five years. And the reason why WDAT is lower is because it is more the distribution, sub-transmission level projects. So it's less scope, less time for upgrades, and permitting is a little simpler too.

If you go to the next slide, this is my last slide.

Really, you know, laying out all these challenges and, really, opportunities for improvement, you know, SCE has seen a consistent increase in generation interconnection work with an influx of all these interconnection requests. We are currently implementing a

variety of improvement efforts to better manage the existing project requests and streamline those for the future.

We are increasing the number of our staff in these critical roles, you know, the engineering and also the field skills that we need, the testing, more of the high-level test testing. So it's a very specialized skill that we're trying to build and bring onto our resource plans.

Create a dashboard to track, you know, flag projects that may have been stuck in a stage, one stage too long.

And then again, adding a new tool for intake so that we are able to release, really see where they -- provide some integrated guidance to help the customers through the process. This tool consolidates internal systems into a single source of truth so we know where the latest projects are and the latest project information.

In addition to all these internal improvements, you know, we are very active in broader areas of interconnection reform, as I was mentioning, the ISOs, IPE, and also the FERC generation interconnection reforms. We see a lot of value in aligning all the interconnection requests in the state to the Resource Plan to make better use of study resources, and to really, as we've been

talking about, align where is that resource need, align it with the transmission capacity.

Also I'm very encouraged by some of the conversation that's been happening already. We really need to look at how do we build out this transmission grid? It's more of a longer-term, maybe medium-, longer term solution here to what we need to reform immediately. But what can we do to be proactive in building out the transmission system? And the current ISO plan, I think, is a huge step in that direction because I think that's what's really going to get us to meet our climate goals that the state has let out, that has provided to us as a North Star.

So I think I am done. So Neil, I'm going to hand it back to you.

MR. MILLAR: Thank you very much, Dana.

Okay, so next I'll introduce Savir Nagra, Director of Asset Planning at Pacific Gas and Electric, and Marco Rios, Manager of Transmission Planning at PG&E.

MR. RIOS: Good afternoon, Neil, thank you so much. I will be talking today. And similar to Dana's presentation, we prepared a few slides that are intended to give you a high-level overview of the various stages of interconnection process, as well as some of the challenges and specific metrics for PG&E.

So if we could go to the next slide, please?

Thank you.

We chose to show four stages here, but really it follows the exact same process as Dana just described. And so I will not read everything on here. I'll just highlight a few key areas that I think are important to understand.

And for the first piece, you know, after the customers have submitted their application, we, the CAISO staff and PG&E staff, we spent considerable amount of time with the customer reviewing and validating the application information, just to make sure we have all the data necessary and it's complete so that we could move on to the next stage and do the studies.

What we find, also, that we think is really valuable here in this stage is that we help, in those conversations, we also help the customers, giving them input on the feasible interconnection options. And we think that this is good information for them, too, and for the success of the project. So I wanted to highlight that.

In the second stage, that's where we proceed into the technical study work, two phases, as Dana described. And here, what I want to highlight is how comprehensive and complex the studies are. And they are designed to identify the requirements for these generation projects who connect to the grid reliably. But, you know, the more projects that you have to study, you also identify a lot of possible

violations that require mitigation and cost responsibility. And as you could imagine, as the numbers grow there, the mitigations get more complex and so on.

For the third stage, that's when we -- after the studies, assuming projects are moving forward, very key to get into the execution of the generation interconnection agreement and posting some of the financial securities so that we could initiate some of the project activities, like project design, which is going to inform the project permits. And, also, it's becoming very key now to get ahead of ordering long lead material procurement. So it's very key that those IAs are executed timely and we get the financial postings there.

And similar for once we get into the actual execution of the project, we need to -- you know, ideally we have the project's financial hosting secure so that we could actually get into building the project. So at this stage, we get into the construction. And, also, I'll speak on the next slide about the challenges about the clearances when you're talking about many, many upgrades.

The one last thing I want to highlight here, we added a bullet at the end of each phase just to show, in addition to the customer, in addition to the CAISO staff, just a massive amount of effort that takes, just within PG&E, to coordinate and manage all of these studies, all

the different activities. It's multiple departments. And even though you're looking at, you know, a pretty five-, six-year period here, when you're talking about all these things that need to happen, it feels like you don't have time. It's a very aggressive process. So just wanted to highlight that.

Next slide, please.

This slide, we cover some of the same things we've been discussing. If you add it at the time, we come up with the same rough timeline as Dana just described. We have a six-year process from when the time an application comes into the CAISO until it can be a project could come into service, so that's a challenge.

I alluded to Neil also has discussed the challenges with the technical studies. Given the large volume of projects and megawatts that we're having to study, the studies are becoming more and more complicated. And also the upgrades that are resulting out of that are also large. And those can be difficult as well, not only to plan for, but also then to design and execute.

So there are sometimes places where we need to upgrade multiple lines in a corridor. And in some of those areas, for example, clearances can become very difficult, a huge challenge; right? Because you do want to ensure that when you're taking elements out of service, that you do

have a reliable system. And then you also have to coordinate that with the regular maintenance work that is happening at the utility. So those clearances could definitely become a challenge as the projects get more and more complicated.

We've also talked about constrained resources and we're talking about the highly skilled engineering folks that are needed in other areas. And these folks, it takes -- it's an industry wide concern. It's difficult to find, to hire, and then to train these folks. This is ,for sure, a challenge that we continue to struggle with.

And then the last piece, customer readiness, we want to make sure that customers are ready to, you know, execute an interconnection agreement to put down their financial posting so that we could start working on project activities so that, you know, there is not delays from that point of view. And if there are delays there, sometimes we could see that, you know, there are projects downstream that could be impacted.

Next slide, please.

Yeah, this is a pretty full slide, but I think it has some of the same takeaways as Dana showed.

What really we wanted to show, if you focus on the first grouping, for example, we wanted to show for the last ten years the number of applications that have come in

for that particular cluster year for the beginning service area, and then the number of megawatts that came in. So if you look at the first one, I think it says 28 and close to 1,900 megawatts there. And for the many of the years up to Cluster 13, the number of applications never exceeded more than 70 and less than 20,000 megawatts. That wasn't the case in Cluster 14 where we received 185 applications and over 46,000 megawatts of generation just in the PG&E system. So as we've stated before, that makes the study process very, very difficult.

The other interesting thing as you look at the chart is the second bar, the light blue bar there, and that really shows the withdrawal rate for most of the -- meaning the projects that eventually dropped out of the queue. And what we saw for the earlier years before Cluster 14 is that that withdrawal rate was about 75 percent, so many of them were withdrawing at some point in the process. But in Cluster 14, more than half of the folks remain in the queue and are going through their phase two studies. So again, we're dealing with a lot of megawatts.

So all in all, today we have 197 active projects which would add about close to 45,000 megawatts of resources to the grid. And for comparison purposes, the PG&E peak load is 22,000 megawatts. So when you have studies where things need to, you know, balance out, you

know, for the studies, this represents a huge challenge.

Okay, I think we should move to the next slides.

So what are we doing at PG&E to address some of these concerns?

On the staffing part, we are continuing to monitor the staffing levels and resources needs and acting as necessary. One example is in 2021, we created a group specifically to deal with generational interconnections when it comes to substation and transmission line engineering. That group has really, really -- it was almost a fun time to help with this Cluster 14, it's super helpful there. And also we've increased staff in other areas like in planning organization, we hire contractors as needed as well.

Processes, when we get to the execution piece of the process, we are continuing to review the type of activities that we do there for internal approvals. And when can we start, you know, pulling certain triggers there? And we're trying to get better at the execution process phase of the process.

We continue looking at innovative ideas or out-of-the-box ideas. The one example we put here is 500 kV circuit breaker upgrades. What we identified through the process, through the study process, is that they needed to be replaced, which would have taken not only a huge

investment, but also a long time to be able to clear those lines to replace those breakers.

And so we working with the manufacturers, we were able to just upgrade those breakers so that they didn't have to be replaced. And that was super helpful in that we did not have to deal with the replacement of them.

The last piece is transparency and getting involved. We continue participating through the transmission development forum, providing status on our projects, answering questions.

And then the last piece is we continue working with the CAISO on the initiatives that they have to address the issues that are being discussed.

And that is the end of my presentation. Neil, I'll give it back to you.

MR. MILLAR: Thank you very much, Marco.

So moving right along, I next get to introduce Simret Tesfagiorgis, who's the Transmission Planning Manager at San Diego Gas & Electric.

Simret, I'll turn it over to you.

MS. TESFAGIORGIS: Thank you, Neil. Good morning. Can you hear me okay? Alright. Good morning, everyone. So I'll be covering for San Diego.

So as, you know, just like my two predecessors, right, SDG&E's generation interconnection process follows

CAISO study process; right? Our role here, in the steps we take throughout the process, really up to the completion of the study phase, are largely similar to what was just covered by, you know, PG&E and SCE, and it involves the application processing and, again, the two study phases. And the timeline for each step is really coordinated and follows cluster study plan and is governed by the tariff.

So for SDG&E, the estimated time for the upgrades that are needed are, by the end of it all, gets issued in the study report we provide to the customers. And again, after the study phase, the time it takes for GIA execution and up to energization typically depends on the customer. So that's dependent on the IC, their interest and how quickly they can overcome the challenges that affect the development of their project, you know, challenges such as, you know, getting PPA, securing land rights, and other issues. So SDG&E, we try to move at the pace of the customer to get resources online as quickly as possible.

Next slide, please.

So we are currently on track to build upgrades that are needed to support interconnections, avoiding delays to schedules and milestones while maintaining a high degree of service. This is, you know, to say that we're coping and we're moving along. And we do so closely collaborating with CAISO and our interconnection customers.

And again, this is despite the ever increasing queue volume that continues to be unrealistic to study; right? This large volume, again, distracts the resources, the same resources that would be needed, you know, to get near- to mid-term resources come online or projects come online.

So just looking at the chart, looking at clusters 14, 11 gigawatts, whereas of interconnection is seeking, you know, is seeking interconnection into SDG&E system. Out of that, 41 percent currently withdrew even before moving to Phase II.

So, you know, in a sense, we are keeping up with processing all these interconnection, but the process is inefficient; right? So it requires improvement. So SDG&E will continue to stay, you know, actively involved in initiatives to help with this, such as, you know, CAISO's interconnection process enhancement and to help manage this overheated queue issue.

Next slide, please.

So, you know, it's good to have the resources in queue, available in queue and wanting to connect for resource adequacy. And we need to connect these resources faster. And it's been, you know, echoed several times throughout, you know, today; right? And this cannot happen without having transmission. And it's encouraging to see a Transmission Plan included in this year; right? But for

SDG&E, what we see is the biggest hurdle for having transmission is permitting; right? So permitting is really key that we need, you know, that needs to be formed; right?

So from SDG&E's perspective, this may be a good opportunity and this may be the biggest item that, you know, that needs to be addressed, right, to get the resources online sooner. And we hope here, the Commission and the stakeholders would continue to work harder, right, to make, you know, the resources critical, you know, that are needed and need to qualify for RA online. So, you know, Neil, that's pretty much what I have and thank you.

MR. MILLAR: Thank you, Simret.

Okay, so next I get to introduce Lauren Silva, who's Manager of Energy Businesses and Regulatory Compliance Programs with the Imperial Irrigation District.

Lauren?

MS. SILVA: Good afternoon, Neil. Thank you. I'm Lauren Silva representing IID and I oversee the interconnection process.

Next slide, please.

So the Imperial Irrigation District was organized in 1911 under California Irrigation District Act and is governed by a five-member board of locally elected and appointed officials. IID is a publicly-owned utility and

is the sixth largest utility in California, controlling over 1,100 megawatts of generation, and it is its own balancing authority.

Next slide, please.

IID's Open Access Transmission Tariff, or as we call it, its OATT, was adopted by the Board in 2001 and it identifies IID's process and requirements to seek interconnection to the IID system.

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IID's current generator interconnection process is a serial first come, first served process. An interconnection customer will submit an interconnection request with associated technical data and the required deposit. IID will then have five business days to acknowledge the interconnection process and either provide the interconnection customer with a list of deficiencies or deem the application complete. If there are deficiencies, the interconnection customer will have an additional ten days from IID's notice to cure such deficiencies.

Once an application has been deemed complete, IID posts its interconnection request on the OASIS site and has ten calendar days to schedule a scoping meeting. After the scoping meeting, IID will tender a System Impact Study Agreement and will have 90 days to provide a complete application and will have 90 days to perform such study.

IID will then host a results meeting and if the customer accepts the System Impact Study, then IID will tender a facility study agreement. IID will then have 90 days to perform the facility study. If the customer accepts the study, IID has 30 days to tender a generator interconnection agreement.

As you can see, IID's process is roughly 150 days.

Next slide, please.

IID's System Impact Study identifies impacts to its system and defines the mitigations needed for interconnection. The Facility Study refines the mitigations and defines the infrastructure needed for interconnection. The Generator Interconnection Agreement contains the contractual obligations of the interconnection customer to build the infrastructure and costs associated with interconnection.

Next slide, please.

So there’s one process to interconnection to IID's system, however, it's a separate process to actually export energy via transmission service. A customer must submit a transmission service request via IID's OASIS site, along with associated reserve capacity deposit in order to secure transmission service. If IID has capacity to serve the request, IID will tender a Transmission Service

Agreement. If IID does not have capacity to serve the request, IID will have 90 days to perform a Transmission System Study and identify the upgrades needed and the customers responsible for the costs associated with such upgrades.

Next slide, please.

So what are the IID's trends? IID has seen an increase in interconnection requests since 2021. In 2021, IID had only 17 projects in its queue with 2,370 megawatts of capacity requested with 9 active GIAs. Today, IID has 42 projects in queue with over 5,800 megawatts of capacity requested with 13 GIAs in active construction. IID has seen a trend of storage-supplementing solar projects, as well as standalone storage.

Another trend IID has seen this year with regard to transmission service is the request for bidirectionality, customers wanting to import energy from the CAISO to charge their battery energy storage systems. Geothermal requests have remained steady over the last several years.

Next slide, please.

So IID does have challenges facing with the increase of interconnection and transmission service requests. Staffing constraints are one of IID's biggest challenges in accelerating the interconnection process.

IID's interconnection team consists of two employees, while IID's transmission planning staff consists of five. The amount of interconnections received versus the resources available has extended IID's timeline for System Impact Study completion from 90 days to approximately 180 days.

In order to keep up with the inundation of requests, IID is transitioning to a first ready, first served cluster process and has closed its queue window as of May 1st, 2023.

Another challenge IID is facing is transmission service saturation. IID's export capability is fully subscribed with requests in queue. Along with technological advances also come challenges. Bidirectional charging is new to IID and affects our operations, procurement, planning, and billing departments. IID is trying to fully understand how grid (phonetic) charging will affect us as a whole.

Next slide, please.

So what is IID doing to resolve these challenges? As I mentioned, IID closed its interconnection queue and will also take this time to improve its interconnection process, and it's finalizing its reform to its Open Access Transmission Tariff. Under the reform, IID is moving to a cluster process with a first ready, first served approach. IID plans on implementation of the revised OAT by January

1, 2024, subject to final Board approval.

In order to interconnect clean resources to its grid, IID has several transmission projects it's participating in. The Salton Sea Transmission Line project is a proposed 230 kV interconnection from IID's Ramon Substation to SCE's Devers substation. The project is customer driven, and it's needed due to the large influx of geothermal interconnections into IID's queue that require a new path into the California ISO.

The project is currently in the study phase with Southern California Edison under its Transmission Owner Tariff and is expected to be completed July of this year. The project will be approximately 15.6 miles of new transmission line with a proposed in-service date of Quarter 3, 2026. With this new transmission line in service, IID can anticipate on having approximately 1,100 megawatts of additional export capabilities.

IID is also in the process of increasing its Path 42 rating from 750 megawatts to 1,300 megawatts, giving IID an additional 550 megawatts of export capability. The Mirage 2 Transmission Project is a new transmission line from IID's Ramon Substation to SCE's Mirage Substation and will stabilize issues experienced during Path 42 contingencies. The proposed in-service date for this project is quarter 3 of 2024.

IID is currently in construction with regard to 18.1 miles of its S-line that spans from El Centro Switching Station to Imperial Valley Substation. Part of the project is the upgrade of Bank 5 at El Centro Switching Station, which will also increase export capability. IID participates on completing this project this year.

IID is also a major stakeholder in the North Gila to Imperial Valley Number 2 project. This project is a new 500 kV transmission line from North Gila to Imperial Valley with a 500 to 230 kV connection to the IID system, with an anticipated in-service date of 2026. This project is expected to increase the east of the Colorado River Path, West Path 49's transfer capability by 1,250 megawatts.

In order to improve its clean resources and enhance grid reliability, IID is actively working on participating in the energy imbalance market. This will assist IID by providing low-cost renewable energy as needed to serve real-time consumer demand.

Next slide, please.

So IID strives to serve the community in which it serves and has prided itself on providing reliable, efficient, and affordable energy service, including open access to transmission. IID has exceeded all renewable portfolio standard requirements to date, procuring renewable energy from diverse sources, including biomass,

bio-waste, geothermal, hydroelectric, solar, and wind. IID has adopted to changes in technology and resources over its years.

Last slide, please.

So IID has facilitated development of renewable projects and has interconnected a total of 42 projects to its system at 1,327 megawatts a generation. IID has 13 projects with active GIAs for another 953 megawatts a generation. And this is outdated because our queue did close prior to me having to turn in these slides, so IID does have 42 projects in its current queue at 5,803 megawatts of proposed generation.

Back to you, Neil. Thank you.

MR. MILLAR: Well, thank you for that, Lauren.

So before I turn it over to dais for questions, I think I would just make a few observations.

I think what you've heard is there's a lot of focus being applied to both managing the intake, the projects that are studied in the various processes, as well as how we go about conducting those studies and producing meaningful, timely results and moving through the process.

A few other common themes I just wanted to call out in particular, one is directly associated with that, which was the access to fully qualified staff to conduct the increased amount of work that's required to deliver

these results. And also, there was also a recurring message around the permitting challenges and the time that it takes to get permits for the necessary transmission reinforcements to get transmission or resource interconnections in place.

I just thought I'd call out some of those key observations, but now I'd be pleased to turn it over to the dais for questions.

COMMISSIONER MONAHAN: Yeah, and just ask my fellow members of the dais to put your video back on. And if you want to make a comment or have a question, if you could raise your hand, that would make it easier for me to call on you.

And I'm just going to start with a question around this first ready, first served approach that IID and LADWP earlier mentioned that they're taking. And just wondering, I'm not sure if any of the IOUs or Neil can speak more sort of comprehensively about whether there's applicability to that strategy broader than those two POUs?

MR. MILLAR: Well, it's Neil. I'd be happy to jump in with your first comment on that.

In general, when we hear people talking about transitioning to the first ready approach, that's often used to refer to transitioning from a more serial study process of dealing with each application as it comes in,

and any future application takes that earlier application into account. The first ready approach is more along the lines of the cluster study approach that we've been following for a number of years. And that approach did serve us very well for the better part of a decade, but it also runs into limitations when you start reaching this type of pace of resource development and the corresponding surge and interconnection requests.

And that's where the transformative changes I was talking about would still be keyed off of a cluster study approach but focus more on managing the intake of focusing our staffing resources, in particular, on the zones where resources are most likely to be developed that are aligned with the transmission planning and resource planning conducted by the state agencies, and also managing the numbers that we study even in those areas. I won't name which particular substation, but in Cluster 15, for example, we did receive, I believe, about 18,000 megawatts of interconnection requests at a single substation.

So even the cluster study approach and saying, well, we'll study everyone in a zone at the same time, that's clearly not going to produce a meaningful result. So we need to look at both of those issues. And I would say what we're doing now is needing to build beyond an initial step of first ready and take it to the next level.

COMMISSIONER MONAHAN: Elliot, I see you have your hand.

PRESIDENT MAINZER: Yeah. Thank you, Commissioner.

Neil, I was going to ask you maybe to click on that just a little bit more detail. When we think about, you know, the zonal approach that you and the team have developed, you know, based off lots of stakeholder feedback and some of the changes that we're contemplating in the interconnection process enhancement process for 2023 are clearly designed to try to help, first of all, try to get out of some of the, you know, just the process of developing studies that, quite frankly, in certain cases just aren't meaningful in terms of what's actually needed for the grid, consume huge amounts of workload, and really are, honestly, disconnected from the actual demand for power and transmission in different locations.

Can you just talk in a little bit more detail specifically how you see some of these, the IP enhancements that we're thinking about, potentially making material impacts on that and how the zonal approach can get us out of this process where the transmission planners are so paralyzed with processing incredibly huge numbers of interconnection queue request that it's really distracting from doing the planning and procurement that's most

essential for resource onboarding?

MR. MILLAR: Yes. Thanks, Elliot. Yes, I do see what we're looking at here with prioritizing where we focus our efforts and our collective resources on developing interconnection proposals. And some reasonable volume in those areas are critical to both reducing staff workload so that they're not distracted with producing somewhat meaningless studies, as well as enabling more meaningful results to be delivered more quickly to the projects that are more viable.

Our current process requires us to treat all incoming applications in an interconnection window equally and create the opportunity for projects that are even interconnecting in areas that are severely transmission constrained and where the economics of reinforcing the grid into those areas is clearly not palatable. We're still obliged to develop full detailed analysis for those projects as well on the off chance that the resources are interested in funding those upgrades themselves. And that's almost never acted upon, especially when we're talking about these more expensive upgrades.

So earlier prioritization of the areas, and for the industry to know that those are the areas, this is not meant to surprise people, the industry knows that those are the areas that we're prioritizing and that we will

prioritize and that we will be studying a reasonable volume and need to find a way to manage. And by reasonable, I'm not talking about just capping things at the volumes that are expected to be procured. We know we need to support a good, effective, competitive market for new resources.

But the level of oversupply coming into the queue are generating these results that are simply not meaningful. They're only being developed for the sake of developing a hypothetical cost gap structure. But we can be planning facilities that will never get built because referring to my earlier example of 18,000 megawatts connecting at a single substation, any plan geared around that will just not be meaningful.

So we see it being helpful on both of those aspects --

PRESIDENT MAINZER: Thanks.

MR. MILLAR: -- helping the industry prioritize where they're paying attention, and also helping us prioritize where we focus our precious planning and engineering resources.

PRESIDENT MAINZER: Thank you.

COMMISSIONER MONAHAN: Can I ask, Neil, and then I'm going to turn it over to the Vice Chair, who is the decider on whether we can avoid doing these costly studies? Is that FERC or --

MR. MILLAR: Well, the process changes that we're talking about will need to be approved by FERC. When we were dealing in different times with a much more relaxed cadence of new resource development and much smaller volumes in the queue, we were able to manage having, you know, people apply wherever they wished. The cadence allowed for providing study results. The projects that were not likely to be successful dropped out or perhaps lingered for a few years. And there was time for, then, procurement to take place, prioritize or select which projects would move forward, and that was working relatively effectively for that volume.

But now when you talk about needing to coordinate and ramp up a massive transmission bulk system redeployment in parallel with resource development occurring at an unprecedented pace of adding, you know, over 7,000 megawatts of installed capacity a year, those processes just don't allow that.

So this is the stakeholder process we've embarked on. We've been communicating the overall strategy, but there are a lot of details to iron out. And that we will ultimately have to take to work to amend our care to enable that prioritization.

COMMISSIONER MONAHAN: Thank you.

Vice Chair Gunda?

VICE CHAIR GUNDA: Thank you, Commissioner Monahan. Just wanted to first start off by saying how awesome the panel was in just laying out some key timeframes that we need to consider as we think through this. And I have three dinky questions that could probably be tied together, not a broad one.

So, Dana, you mentioned, I mean, if I heard it right, that there is additional complexity in interconnecting storage projects, if I heard it right. I'll just frame my three questions, and then I'll just let you comment on them.

I think second, I think just from Commissioner Monahan's, you know, opening remarks, in the spirit of kind of figuring out what can be done in kind of enhancing this work very quickly, so maybe Neil, hearing from all the, you know, panelists here, what is the -- like, I mean, we have transmission. We talked about three elements. We have transmission. We have RA and IRP planning. And we talked about just the interconnection issue.

Do we have kind of a general idea on, based on the existing transmission, how far are we from kind of basically dropping off a cliff here on like being able to interconnect the necessary resources?

And how are we planning, I think the third question, the synchronization of what the existing capacity

is to interconnect, and how are we prioritizing to bring it back to what Commissioner Monahan was asking?

Sorry, the they're three separate questions that I thought could be framed together.

MS. CABBELL: Yeah, so I'll jump in first while Neil is jotting down the questions so he can respond. So thanks, Vice Chair Gunda.

Yeah, my point was not difficult to interconnect, but when you're studying energy storage, clearly you have to study the discharge and the charging. So now you're doing two types of studies; right? You're doing almost a load study. Is the grid able to serve that load by charging, especially if it's not a hybrid connected to a solar field? If it's a standalone storage is kind of what I'm referring to. And then, of course, discharge. And it could be different, because depending on the loading of the system as you're charging or discharging. So it just adds complexity to this study process, not necessarily complexity to interconnection.

MS. AULD-HILL: I'll also add in there quickly, as well, that I think, Dana, you mentioned earlier, Edison has a lot of remedial action schemes and centralized remedial action schemes. And a large part of that is knowing whether something is charging or discharging, which is fairly easy if you've got a load or a solar generator.

But as you add batteries, it becomes a lot more complicated to understand what's happening, as well as how that then interacts with the CAISO market model and that dispatch.

So there are a number of kind of concerns and opportunities, but concerns as well in those older systems trying to catch up to this new battery future that we're looking at.

MS. CABBELL: Thanks, Alison, for jumping in. She works with us day in and day out, so she's just kind of the expert on this challenge.

MR. MILLAR: Yes. And it's Neil.

Just tagging onto that, there are areas where remedial action schemes that may have been a viable solution when we were dealing with a simpler basket of resources are simply becoming too complex to operate.

And this past year, we have made changes to our remedial action standards around the level of complexity that can be designed around in a remedial action scheme, recognizing that we're dealing with what's becoming an increasingly much more complicated fleet of resources, that the old assumptions that fade into RAS design don't work anymore. And we've had to seriously reassess when are remedial action schemes a viable option, and when do we need to actually move on a transmission upgrade in lieu of a remedial action scheme.

Vice Chair Gunda, you also raised the question about the existing capacity. And I think that's something we need to clarify. You know, a common narrative we hear is there's no capacity available. There is transmission capacity available in the system, and we are maintaining a steady pace of new resource interconnection. But when people are coming in and applying new, they're behind a very long list of projects that have applied ahead of them in earlier clusters.

And that's a real concern about are some -- is some of the transmission capacity right now being held back from future or new interconnection requests by projects that are not ultimately likely to be successful? But the processes in the past were a bit more friendly about letting projects stick around longer and see if there was an opportunity with it would develop. So that's something we definitely need to look at.

The last time we posted this, I believe, was a year and a half ago, but we did take the unusual step of actually identifying all the projects in our queue that could actually move forward without needing any major transmission upgrades to move forward, just to provide that clarity. And we look to do that again once some of the dust settles on all the current applications as projects have been coming in and withdrawing. You need to have a

certain stable few months of stability there to work that out. But since then, I believe about two-thirds of those projects are under a Power Purchase Agreement and moving through the interconnection process.

So there is transmission available, but now we're talking about picking the pace up from, you know, several thousand megawatts of installed capacity a year to 7,000 and sustaining that. And clearly, we need the upgrades, and we need the upgrades to occur on a timely basis to match that rapid acceleration in resource development.

VICE CHAIR GUNDA: Thank you, Neil. Just kind of on that one, so closing that off, you know, so we are talking about existing. You know, we have some transmission capacity, and we want to use that wisely, and we want to make sure the resources are connected as quickly as we can.

So just in that, when we talk about transmission, you know, we're talking about, you know, transmission interstate. We're talking about, you know, peak availability, you know, all sorts of things. Could you just comment on like, you know, just you said last year during the study, you were able to identify the net amount of projects that could be connected, so what is the ballpark of that? What's the ballpark number of, you know, NQC --

MR. MILLAR: Yeah.

VICE CHAIR GUNDA: -- or whatever the transmission could handle today?

MR. MILLAR: Well --

VICE CHAIR GUNDA: I understand it kind of depends on where you are connecting and all that stuff.

MR. MILLAR: Yes, it's dated now, but I believe that list at the time identifies up to 20,000 megawatts that could be developed with minimal transmission upgrades. Some of that did require remedial action scheme upgrades that Dana mentioned can also be a problem. We were focusing at the time on new transmission construction that would be running into permitting. So when we looked at needing no upgrades, that was down in the 5,000 or 6,000 megawatts at the time.

But I do believe that we're well positioned for the next few years on -- you know, it's not that we're not able to connect resources, but we cannot sustain this pace without significant new transmission reinforcement.

That also involves, though, literally drawing on all of the resources as opposed to a competitive supply. If your competition is limited to only those projects, that puts the load serving entities in a much more difficult position, so we definitely need more capacity.

So it's a balance. We need more capacity going

forward. We need these projects to be successful. But there is capacity available, and we are sustaining the pace of development now, we're just concerned that we will not be able to sustain that if we don't refine these processes and move forward very quickly with refining these processes.

And things like Cluster 14 --

VICE CHAIR GUNDA: Thanks.

MR. MILLAR: -- and Cluster 15 have the potential to stall us completely. You know, those are real risks of trying to manage those volumes through our traditional processes.

VICE CHAIR GUNDA: Thank you, Neil. That was super helpful. Thank you.

COMMISSIONER MONAHAN: So let me pass it to Commissioner McAllister.

And just to highlight, we're trying to end at one o'clock so everybody can get a break for lunch before the next panel.

COMMISSIONER MCALLISTER: Yeah, just hopefully quickly, really appreciate the sort of nuanced discussion of existing process and how it can be improved and streamlined.

So Neil, you mentioned sort of, you know, trying to get to the worry of having projects that aren't likely

to be built, you know, sort of standing in the way of projects that are. And I guess as we move towards, you know, what sounds like more of a proactive, almost a concierge approach to kind of identify the projects, sort of force the issue a little bit and get those projects that are most likely needed to bubble up sooner, where are -- you know, we have a lot of, you know, process kind of constraints and legal obligations, et cetera, to sort of follow in a relatively publicly accessible way, et cetera, to sort of, you know, follow in a relatively publicly accessible way, et cetera.

Where are, I guess, the risks of that sort of more proactive, you know, pushing to sort of get to a smaller group of viable projects more quickly?

And I guess, you know, the idea that's kind of floating in my head, and maybe it's a little bit behind the scenes here, is, you know, can there be a much more direct set of criteria to really kind of force that top tier, you know, the cream, to come to the top more quickly?

And in particular, the role of financing. Several of the speakers mentioned financing, you know, and it's clearly a key kind of criterion for viability. Is there any way we could sort of, you know, use that as a threshold kind of condition for projects to be taken seriously within those criteria?

MR. MILLAR: Yeah, so the criteria themselves are some of those details I mentioned we will be needing to establish through -- you know, in transparency here is the key, and putting it bluntly, that the process changes we're making and the criteria that we use for where we're going to prioritize, those need to be developed through a public transparent process, and that's our stakeholder process that we're embarking on to land on those criteria.

You know, immediately upon identifying a strategic direction, stakeholders raise concerns about open access principles and competition principles, and those will need to be respected. And we will need to be pushing, but what we see needing to do is to push this envelope as far as possible.

So while we're going to be looking for getting the best possible outcome we can on this, some of those principles could result in pushback where we don't get everything we're looking for, but that's not a reason not to move that direction. So we need to move the ball as far down the field on this issue as we can and do it through a public transparent process so that people involve the generation community.

And I should mention that I think there's significant agreement in the resource community that changes are made. There's a lot of concern around the

specific details and how their particular projects would be affected, but we've seen a lot of support for moving in this direction and making these changes.

And like I said, the issue for us will be being fully transparent in what those criteria are, as well as what the transparent plans are around which those criteria will be applied. And we've been thinking initially that the first wave is focusing on the zonal approach around where the infrastructure is being built, but there will be other parameters that can be taken into account, as you've mentioned, financing status and some of these other conditions that can be layered in.

And that's what we have between now, putting it bluntly, between now and the end of the year to work out so that we can apply a more rigorous set of principles and processes for the Cluster 15 projects when we start moving on processing those projects in early 2024.

COMMISSIONER MONAHAN: Great.

COMMISSIONER MCALLISTER: Thank you.

COMMISSIONER MONAHAN: Well, thank you, Neil, and thanks to this panel, really helpful discussion. Lots of good food for thought. And I was actually very sobered by the presentation by Dana around the number of applications that just drop out, the fact that like less than 20 percent actually make it to the finish line is pretty interesting

and shows there's some room for improvement in terms of the process.

So we're breaking for lunch now. I'm going to actually pass it to Heather just for any information you want to give to folks about when we're convening.

MS. RAITT: Yeah, thank you so much.

So we're going to close the meeting here, but we'll be back promptly at 1:45. So sorry for the inconvenience, but everybody will need to log in again. And that will, again, we'll start back here at 1:45. Thank you so much.

(Off the record at 1:01 p.m.)

(On the record at 1:45 p.m.)

MS. RAITT: Alright, well, we'll just give it another moment for people to log on.

So, good afternoon. Welcome back. We're restarting the workshop on the Clean Energy Interaction -- excuse me, Interconnection of the Bulk Grid. And I'm Heather Raitt, the Director for the IEPR.

Just briefly, the hearing -- the meeting schedule and the presentations are all available on the IEPR webpage from the Energy Commission's website.

And just a reminder that we are recording the session this afternoon, as we did this morning, and we'll have a transcript and a audio recording posted on our

website.

There will be an opportunity for the public to make comments at the end of the day. We'll ask one person per organization, and we'll set two minutes aside for each person.

And alternatively, we always welcome written comments, and those are due on May 23rd.

So, with that, I'll pass it over to Commissioner Monahan. Thank you.

COMMISSIONER MONAHAN: Yeah, thanks Heather.

And any fellow members of the dais, if you want to make remarks, just raise your hand.

I'll just state briefly, so the morning session was really great, densely packed, and the afternoon is also going to be densely packed, so let's be ready to power through.

The morning was really focused on sort of what's happening now, sort of the like how the IEPR, the Energy Policy Report, fits into the CEC's planning world, the foundational role of transmission and timely interconnection for meeting our climate and clean energy goals, and then policy-driven planning and ongoing improvements, as well as interconnection processes and ongoing improvements from the side of the utilities, including both POUs and IOUs.

So the afternoon, we're really going to focus. The beginning is going to be on developer perspectives. And the second is going to be on sort of recommendations writ large for improving interconnection, expansion, and utilization on the bulk side.

So I want to see if any of my fellow members of the dais want to make any opening comments? I'm seeing nobody, right, so why don't we move right into the panel, and I'll turn it over -- I think, am I turning over to Ben, Heather, or --

MR. WENDER: Yeah, I'll jump in and just give a quick welcome to our panelists for sharing development, developer and association perspectives. I want to introduce my colleague Rohimah Moly. She goes by Moly, who is deputy director for climate and energy in the Governor's Office of Business and Economic Development, or GO-Biz. Moly will be moderating this session.

And I'll let you take it away. Thanks, Moly.

MS. MOLY: Thanks, Ben.

So good afternoon and welcome back. As many of you have heard or tune into this morning's session, you know, the state needs to build and interconnect anywhere from 6 to 7 to 8 gigawatts per year for the next ten years to meet expected growth and, you know, our long-term goals. We heard from representatives from the energy agencies and

the utilities about the processes for resource planning, transmission planning, and interconnection. And as Shannon mentioned earlier today, there's not a problem in finding these projects or those who want to build the projects that we will need, but one of the main challenges is the transmission capacity for interconnecting new resources to the grid.

As we all know, you know, interconnection issues is not only, you know, a problem here in California, but it's an issue across the U.S. And as we explore and consider ways to improve policies and processes at a more high level, we are also doing what we can here in California at the ground level to help ensure that these projects that are under development currently come online and on time.

So about two years ago, two and a half years ago, the Tracking Energy Development, TED, Task Force was formed to track high-priority energy projects expected to come online within the near term, you know, two, three, four years, with a priority on contracted projects needed for summer reliability. It's a collaboration and coordination between four agencies consisting of the PUC, the CEC, CAISO, and GO-Biz.

So the challenges in the development of large energy projects range, you know, from siting, permitting,

supply chain issues, and interconnection. And TED, you know, provide project development assistance as appropriate, you know, related to any of those areas on a project-by-project basis.

Today, we're going to hear from developers' experience of building large energy projects and the challenges they've experienced along the way, you know, of interconnection, related to interconnection, and where they see opportunities for improvements.

So to kick it off, we're going to start with Rick Umoff, who is the Senior Director and Counsel for the Solar Energy Industry Association.

MR. UMOFF: Thanks, Moly.

Hi, everybody. For those who don't know me, my name is Rick. I'm with SEIA, the Solar Energy Industries Association, the national association for the solar industry.

I believe I have the slide deck that's coming up in just a moment.

So we represent folks both on the utility scale, both sides, as well as on the distributed side. As Moly said, the interconnection challenges are very -- they're becoming very challenging and complex across the grid, both on the transmission and distribution grid. So I'm going to kind of walk through some slides that summarize some of the

issues we're seeing, as well as some of the recommendations that we've taken from our developer members here that are hopefully helpful.

So you can go to the next slide. And the next slide.

So just before I jump in, I just want to say thanks for having SEIA here to contribute to this and, also, thank you for the attention on this important issue. Interconnection really is becoming, is reaching kind of crisis levels. And as Moly said, this isn't just a California issue, this is happening around the country, but it is quite critical in California.

We've always had trouble with interconnection, but it's removing some sort of a headache for developers and PTOs to kind of a key roadblock to meeting our climate targets or reliability needs and, frankly, our overall economic development. I think this even spans beyond our sector into other sectors of the economy and is really costing the state a lot at this point, and it's something that does need really to be addressed.

The complexity of the challenge and the kind of central role that regulated entities, in particular, play in this challenge I think will require policymakers to really stay focused and have a kind of a sustained and coordinated effort on this issue. There's no silver bullet

here. And it really does require kind of just a continued focus and kind of holding the right actors accountable and just kind of working through this in a stakeholder fashion, because they're really -- it really just going to require kind of a collaborative approach to fix this problem over probably a long period of time.

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So just some key things that I've picked up as talking with developers and we hear a lot. One is the shortage of staffing and resources to address interconnection. And this is, you know, something that, you know, we really think needs attention. We think the PTOs and utilities need more staffing. We also think there needs to be more staffing on the policymaker and side as well. We need to staff up for this issue, and it's something that I think we're all kind of struggling with in this space right now, but definitely it's hard to get this done if we don't have the resources.

We continue to hear concerns about transparency and information flow in terms of timelines and in terms of upgrades and prioritization of upgrades. There continue to be struggles with the cost of network upgrades and then the impact that those costs have on the interconnection queues and folks dropping out of the queues.

We are dealing with, frankly, a lack of planning

in this area for some time or a lack of -- at least of a lack of action there sometimes, they're all playing catch-up on. That relates both to the transmission and, you know, network upgrade issue, but also in terms of procurement, kind of catching up on procurement, which now has led to, you know, a significant kind of build-up in the queue. So that is kind of part of what's causing this crunch.

And then the deliverability availability throughout the system is really a struggle. There's really just not that much available deliverability, and these days if you're not deliverable, it's hard to really make a deal work in the California market.

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So in terms of the delays, and these slides are on the record or have been submitted, so folks can look at them in more detail, but in terms of delays and lack of transparency, I mean, we continue to hear about significant delays in just getting upgrades started. And then, also, once upgrades are starting, the multiyear timeframes are actually completing those upgrades. And, you know, this isn't to point the finger at any one entity or anything like that. This is just, this is what we're hearing.

And we also continue to hear that there's really still a struggle in terms of understanding sort of the

prioritization of upgrades. And that makes it difficult for developers to plan, and it makes it just a difficult place to do business as a developer. And of course that leads to just interconnection delays in general, sort of bringing resources online.

So in terms of recommendations here on this issue -- oh geez, that looks like I need to get moving -- we have, you know, more transparency, and also looking at incentives and penalty options for PTOs.

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The next is timelines. You know, we're continuing to struggle with just really long timelines, and we're seeing just as, you know, each cluster tends to be at more and more applications, and so we're going to continue to have these issues. You know, the recommendation here are staffing, education, continued workforce development, leveraging new technology that can help make us more efficient. We think that, you know, having things like cloud computing and big data could help with this as well. So trying to get a little more creative in how we get more efficient in this area.

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The network upgrade costs continue to be a challenge. And what happens is, as folks run into these network upgrade cost, developers that is, they drop out of

the queues, and then that leads to delays, and then the network upgrade costs end up showing up in subsequent cycles.

So we really think, to the extent that we can identify repeatedly, you know, repeatedly identified network upgrades that are needed should be prioritized and addressed. And maybe we should look at cost-sharing options as part of that to help identify and address, especially, the DNUs where deliverability can be made available.

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You know, there's just not enough transmission, I think, is basically the message here. And what we do appreciate is that there's been a recognition by the state and state policymakers that we need to start getting moving on this, but we have a long ways to go, so we're going to. You know, we really just need to be digging in here, accelerating milestones to the extent possible, looking at other avenues, looking at economic-driven projects, and also looking at grid enhancing technologies, like storage and transmission resource, as a way to address this.

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And the last item, quickly, is something that I think a later panel is going to talk about, but just increasing available deliverability on the existing system,

we think, is also important.

So I think that's my time, and I'll hand it off. Thank you.

MR. WENDER: I think you're muted, Moly.

MS. MOLY: I'm sorry.

So next up, we have Sergio Duenas with the CESA, the Energy Storage Alliance.

MR. DUENAS: Hi. Good afternoon. I'm Sergio Duenas. I am Policy Manager for the California Energy Storage Alliance. We are a membership-based advocacy group representing over 100 companies in the energy storage ecosystem in regulatory venues in California and federally needed. I am not using slides today. I just prepared some remarks.

I think that the conversations around interconnection recently have been very fruitful, and it's good to see so many of the key stakeholders come together to try and solve the issues that we're facing. So far, much of the discussion at the ISO and other venues has been focused on reducing the backlog by setting strict criteria and high costs in order to minimize what some have called speculative requests. CESA believes that while this might seem like immediate and attainable fixes, they do not address the fact that given California's ambitious goals and the proliferation of incentives for zero carbon

resources, large queues will continue to be the norm for the foreseeable future across the U.S., not just in California.

So as the ISO and other agencies and regulators embark on policymaking, goals and principles of any interconnection and enhancement should be set and upheld.

First, we think that this should include the principles of open access and non-discrimination. There should be alignment in planning processes, respect for technologies and reflection of these technologies and resource capabilities, and reasonably reducing the queue of requests by advanced viability in appropriate ways, overall having more information and data readily available and in sufficient granular accuracy that will support economic decision-making for all parties involved in the interconnection process.

This being said, the agencies should resist blunt proposals that set punitive costs of entry just for screening out projects. Certain refinements to commercial viability should be considered, but we really should be cognizant that these costs are being passed on to ratepayers and that the costs associated with, for example, long lead time projects create some issues around the chicken or egg challenge of LSE procurement and interconnection study for the costs.

So alignment in planning processes is definitely important, but with all that we should not violate the principles that I've described above. So some of our recommendations that we urge the ISO and the present agencies to consider to ensure more agile processing of interconnection requests are three, three key near-term recommendations.

First, the ISO and the relevant agencies should develop means to incentivize PTO performance. There should be concrete timelines for the construction of upgrades and facilities and clear rules as to how to communicate delays and justify them.

Second, the ISO and the PTO should seek to leverage third-party consultants and engineers in a timely manner to guarantee completion of needed studies. This should include automating some parts of the interconnection process, for example, documenting if interconnections requests are complete and validating them.

And third, the ISO and the CPUC should also explore ways in which energy-only resources could meet interim or bridge needs, particularly when considering emergency reliability, as we've seen in the last two years.

Finally, CESA also supports the ISO reevaluating deliverability methodologies. This is a fundamental issue that could really free up significant amounts of

deliverability in the system today.

First, to increase the amount of deliverability available, the ISO should modify their overly conservative assumptions regarding the output of energy storage in their secondary system need assessments. We know that the ISO has recently revised this. They've modified the storage output assumption in the SSN from 100 percent to 50 percent. That is great, but this is still overly conservative.

So the issue here really that is critical is that the input should be reassessed because the ISO is assuming a fixed deterministic profile for storage that is not really reflective of the complementary nature of storage and renewables.

Second, the ISO should explore reassessing the inclusion of N-2 constraints when evaluating for the deliverability, since this is also an overly conservative assumption that is not followed in other RTOs or ISOs.

Why does this matter? Why is this as critical for interconnection as other proposals?

Well, this is because the draft 2022-2023 Transmission Plan is very, you know, historic in its magnitude. And it's very smart that it's given important lead times for the construction of this project. But limited transmission deliverability today is jeopardizing

reliability in the near term. So these fixes are fundamental for unlocking additional deliverability and ensuring reliability moving forward.

Finally, we do urge the ISO to consider developing methodologies to determine if resources are deliverable within local reliability areas that they are located in. This is very important because today we're only looking at deliverability in a systemwide basis, and that may negate the benefits or reliability benefits of an asset in the Greater Bay Area, for example, that is deliverable in that LRA but may not be deliverable in the broader CAISO system.

So those are our recommendations, both near term for the processing of interconnection requests, and also for the deliverability challenges that the state is facing.

Thank you for the time.

MS. MOLY: Thanks Sergio.

So next up we have Nancy Rader, who is the Executive Director at the California Wind Energy Association.

MS. RADER: Great. Good afternoon everybody.

First, thank you very much for inviting me to this panel. I'm really glad to have a chance to present on a very promising, if arcane, topic that Sergio was just discussing, which is the CAISO's deliverability study

methodology. I'm going to do a little deeper dive here and explain how performing that methodology could really accelerate generator interconnections and make more efficient use of our existing grid and every additional transmission project that we build.

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So although we didn't hear much about it this morning, CalWEA is thrilled that CAISO has announced an initiative to review its deliverability study methodology, which should begin later this month.

Now CAISO uses this methodology to determine what reliability upgrades are needed for an interconnection customer to obtain deliverability capacity, also known as TPD capacity, which is what generators need to qualify under the PUC's RA Program, Resource Adequacy program. And the point of the methodology is to ensure that a project will be able to deliver its generation to load when it's needed. The prospect of reforming this methodology is exciting because it could immediately address the current lack of available TPD capacity.

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And this, as Rick and Sergio indicated, we believe lack of TPD capacity is a big problem. Without it, projects can't qualify for RA and generally won't be commercially viable. And from our view, available TPD

capacity appears to be insufficient to meet the state's mid-decade and certainly our longer term SB 100 goals, and that will remain the case until new transmission is planned and built and that's about ten years off, absent major reforms to the process, which we'd also like to see.

Now this morning Neil Millar said that he thinks there's about 5 to 6 gigawatts available on the system now without upgrades being needed, but the PUC's 2026 goals and 11.5 gigawatts, and also that 5 to 6 gigawatts may not be in areas that are viable for project development.

We are finding that many developers who are counting on obtaining TPD capacity, many with PPAs, are discovering that it's just simply not available. Load serving entities, including CalCCA, have recently highlighted that there is already a lack of RA capacity in the market presently. Now even if there is barely enough TPD capacity, the lack of a margin will reduce competition and drive costs up.

Next slide.

But there is really good news, which is that the TPD capacity is a function of the assumptions used in the CAISO's deliverability study methodology. In our view, those assumptions are unnecessarily conservative. And reforming those assumptions consistent with those used by PJM and MISO could dramatically expand TPD capacity, and

that capacity would immediately become available at no cost. And in addition, ratepayers will save because of the enhanced competition. So we really might have a big free lunch here.

Next.

So I wanted just to go through the four reforms that we have proposed to the CAISO and consistent with what Sergio just outlined.

So CAISO performs two tests and we believe we can eliminate one of them and that's the SSN test which looks at high growth system load not at the critical evening net peak period. Now this test is designed to study generator curtailment, not the ability to meet load which is the point of the deliverability study. No other ISO uses an SSN test.

We really don't need this test because curtailment is a commercial concern that we believe will resolve actually with methodology reform and that's because right now a lot of storage is being blocked because they can't get TPD capacity. So once we reform this methodology it'll allow all the storage to be built in high congestion areas to deal with that curtailment. And if not, you know, we can look at economic upgrades.

Also, by the way, eliminating this study will reduce CAISO study workload.

Next slide.

So the second reform is to adopt reasonable dispatch assumptions in the HSN test, and that's the test that looks at the evening net peak. The CAISO doesn't use the PUC's qualifying capacity values in its studies. Instead, it uses its own capacity values which tend to be higher and that requires more TPD capacity.

Now I forgot to note on the slide that CAISO also assumes that storage and solar are being dispatched simultaneously, despite the expectation that solar will be charging storage.

In addition to constraining TPD capacity this methodology is also opaque which, by the way, creates commercial problems as well.

Next slide.

So Sergio also mentioned that we could create a local deliverability designation. The current deliverability methodology requires that resources that are inside a locally-constrained area must deliver to another such area, such as San Francisco to L.A. But we really should rethink that requirement that local resources meet a system RA test. If we had a local test, it would allow local resources to address local concerns and we think CAISO can readily establish that kind of test.

Next slide.

So the fourth reform is that the current methodology as Sergio also mentioned assumes an N-2 condition. That means that two major grid elements are down but instead we could assume an N-1 operating condition that just one major grid element is down. Now this is not a NERC issue, North American Electric Reliability Corporation, I think it is. They have no requirements for deliverability studies at all. No other ISO uses an N-2 criterion in its deliverability studies.

Now the effect of using that extreme assumption is that it blocks the use of available transmission capacity that we need to meet very high stress conditions like the recent heat waves that we've experienced. So even if generators may not be able to deliver during very rare grid conditions, they can still and they should be allowed to get on the grid to address those high stress conditions we have recently experienced in the last couple years.

Next slide, and this is almost done, but it's really important to appreciate how important these reforms are.

In our estimation, reform could free up more than 10 gigawatts of TPD capacity immediately across the CAISO system in areas of the grid that are strong. And it's important to say, you know, it doesn't help in places like in northwest California where the grid is weak. But in

areas where the grid is strong we can add a lot of TPD capacity. That will mitigate if not eliminate the near-term TPD shortages that we believe we're facing now. And we can also maximize TPD capacity from each new upgrade that we build and that will reduce the total amount of upgrades that we're going to need to meet our goals and, of course, that brings a lot of savings. And it will also give PTO some breathing room to complete their delayed upgrades.

Okay next and last slide.

So we're really looking forward to discussing these issues in CAISO's upcoming stakeholder process and are really pleased that CAISO has created this forum.

Thank you.

MS. MOLY: Thanks Nancy.

So next up we have Jess Melin with NextEra Energy Resources.

MR. MELIN: Hey everybody. It's great to be here and thanks for the time today. I don't think I'm going to bring a whole lot of new stuff. I think everything that I've been thinking about for the last few years in California has been covered today but I would like to kind of zoom out at the 30,000-foot level and just remind everybody of the process. Sometimes you can't see the forest for the trees.

So as developers, right, there's a few things we have to do to get projects built. One is, you know, we have to get permission to interconnect to the larger system, and that's the application, key process studies, deposits, all of that stuff. Once we have permission to connect to the grid, we need to go out and order pieces and parts. The transmission owners need to go out and order pieces and parts so that we can actually physically build that infrastructure.

And then throughout that whole process there's this big human element; right? It takes a lot of humans to do all the, you know, construction of the project, manufacturing the pieces, interconnection requirements. We have a lot of Commissioning paperwork processes so there's a huge, huge human element that I don't think will ever really go away there.

And so I'll talk about the challenges and a few solutions on those three main pieces that I pointed out.

So in the interconnection process, as Shannon laid out, you know, Cluster 15 came in, you know, very large at 354 gigawatts. And it was mentioned before, we need to build 86 gigawatts. And then Neil pointed out we already have a 180 gigawatts in the existing queue. And so if you think about that, if we're going to build 86 gigawatts, that's 448 gigawatts of projects that we're

studying that are being put into the models that won't get built. And you know that you all know that uses a lot of resources and bandwidth.

And what that what that turns into for us on the development side is very long delays to find out if you can even interconnect a project. And then it becomes a chicken in the egg, do I spend the money or do I wait to be interconnected?

You know, one case in point, at Next Era, we put in a lot of queue positions. We put one in the Cluster 14 two years ago. So two years later, we find out that the earliest we can connect that project to the grid is 2034, and it's going to be one more year before we know the actual cost of that project. And so I won't even get into the deliverability that Nancy discovered, because that's a whole other issues. If you don't have that, you can't get a contract.

So at this point, it's taken three years to find out, can I connect and how much is it going to cost? And then it's 11 years before I could interconnect that project. And I'll tell you right now, you know, there's nobody in the market that is out there signing contracts for 11 years from today. There's high demand right now. But the interconnections are showing up viable in a decade. So there's a huge disconnect there.

I think everybody knows our business, like all business, likes to wake up in the morning, have a great big bowl of certainty for breakfast. And that's the big piece that's missing in this process. There's just a lot of uncertainty. And it really throws the business process for a loop.

Solutions-wise, obviously, you know, one of the first things that comes to mind is, you know, is there a way to have a meaningful distinction between speculative projects and viable projects? We, like others, you know, submit multiple positions for a single project. You have a lot of reasons for that. One, you have the seven-year timeline, you don't want to time out. There's uncertainty around deliverability. The study process is a bit of a black box. You submit and then you hope for a year, and then you get the results back. You know, we've tried to do our own studies, but we don't have the information that, you know, the CAISO and everybody else does. And so it's kind of a black box.

So is there a way to -- you know, there's a lot of ways that we can, you know, make more viable projects float to the top and we've discussed those, you know, permitting standards, maybe having to have a PPA, larger deposits, clustering requests, stuff like that.

But Sergio brings up a great point; right? Is

there a problem with a big queue? Maybe it's fine to have a big queue. I think the problem is having a large stagnant queue. Could it be possible to have a large efficient queue; right? And a couple ideas around that are, should each project get a free off ramp at some point?

I know a lot of developers hang on to their queue position because they don't want to lose the, you know, they don't want to lose the deposit, even if the project isn't going well in hopes that maybe they could sell that queue position to somebody else. So there's a lot of people who are in the queue that probably don't plan on building the project, but they're remaining in the queue to try to have that economic viability.

And then, you know, when we find out the earliest online date is 11 years from now, there's a reason for that; right? So there are some upgrades that are needed. And the immediate question is: Do we need to wait 11 years to finish those upgrades? Can they be done now or in three years, maybe even five years?

We see some major network upgrades that just repeatedly come up as reasons that we can't connect projects. And so I think, you know, if you look through the historical records, you'd find there's a couple of key network upgrades that we shouldn't be talking about. We should be out there building.

And then obviously, you know, is there a way to leverage technology to speed up the process? A lot of talk around AI. I know our company is doing a lot on the FPL side with AI.

I heard that SPP is actually working with Amazon Web Services, trying to do some cloud computing, see if they could speed up their queue. You know, this has potential to shorten the study process from years to possibly even months. And I think that's in everyone's interest. Even if you had a large queue, if it was an efficient queue, then developers should get in and get out and not sit in a stagnant queue; right? A faster process would reduce the speculative projects. And the project pipelines, I think, would more closely align with market demand.

Then we come to supply chain. This one's interesting because there's a lot of issues that crept up on us in the last couple of years. You know, manufacturing capacity reductions due to workforce issues around the world, increased costs of commodities and shipping, geopolitical challenges like UFOPA (phonetic). We couldn't even get solar panels into the ports this year, so that caused a lot of issues.

But on the interconnection side, I think we're seeing a bit of panic buying mentality; right? Utility

leaders are saying, hey, did you hear there's long lead times in meters and breakers? Maybe we should go put in a big order so we can get those in time for our next project. And then the next week, surprise, right, the lead time is longer for meters and breakers because somebody put in a big order.

So I don't really have much of a solution on that one. I think that just needs to be in everybody's equation. When you're running through your schedule, you have to plan for some slowdown when it comes to supply chain; right? We need more mechanization. We need more stable international relations, domestic. There's a lot of talk about domestic supply, which I think will help. It's a long way off and, you know, there will be a cost implication to that.

And then that human element I talked about. You know, after the IRA, especially, we need vastly more qualified and trained individuals in our company, in your company, throughout this industry. And, you know, there's that old saying, the best time to plant a tree was 20 years ago, and the second best time to plant a tree is today. And I think that holds true here.

I know the development world is hiring very, very quickly. That 354 gigawatts that we keep talking about, right, that's 350, you know, that's -- I don't know how

many projects that is, but that's a lot of projects. And behind each project, there's a developer, and those developers can be making phone calls to the transmission owners and trying to get their project through.

And so I think the only solution there is simple, but not easy, which is we all have to hire more people, and we have to hire them right now. You know, I went out and did the math, and it still takes 365 days to get one year of experience in this industry. So the longer we wait to hire, the worse it's going to be.

So I'd be happy to answer any questions around what we're seeing as developers, but thanks for the time.

MS. MOLY: Thanks Jess.

Can the panelists turn on your cameras so we can start the discussion?

So I know you guys went through a lot of, like, here are solutions -- (Zoom background noise.) Excuse me? Okay.

You know, you guys work across, not just in California, but in other states, projects in other states as well. Are there things that you see in other states that California -- that you would recommend or suggest that California look into to help accelerate some of these projects that we have, you know, in the queue, or can help accelerate project development?

Nancy?

MS. RADER: Yeah. I guess, well, first, I'm just going to reiterate that the two other ISOs I mentioned, PGM and MISO, have a much, I think, more efficient way to address deliverability.

And the second one is that I think many other states don't have such a duplicative process for determining the need for new transmission. I know Shannon touched on this this morning, but I just want to emphasize that the CAISO's proposed transmission projects are based on the PUC's adopted IRP portfolios. So the fact that PUC then spends one to three years reevaluating that need doesn't really make any sense. And one of the most impactful things we could do is simply not to revisit that need determination. There's two bills in the legislature that are aimed at doing that. I think they can be strengthened, but I think this is something we need to do.

Thank you.

MR. MELIN: Yeah, I could speak up on that as well, Moly.

You know, so it's interesting, I've seen across the nation working, you know, in different ISOs, and they all follow the same path at different times. And that is, something will happen in the market, and the renewable industry will finally come to town. And when that happens,

the word gets out very quickly. And the renewable industry quickly overloads the existing queue process. We saw it happen at PacificCorp, we saw it happen at MISO, and everyone approaches it a bit differently. Some people just freeze up and say, no more, that's it. I think, you know, I think that's one viable solution. We saw IID today say, hey, we've closed our queue. You know, give us some time to figure out and to rework how we're going to study this stuff.

I think one thing is communication across the regions, across the nation. It is a national problem. We all use, basically, the same pieces of parts and we create energy basically the same way, and we transmit it and consume it essentially the same way. I just think there needs to be a lot more communication, you know, across the -- without, you know, asking the feds to step in, because that would probably slow it down. But it's not a it's not a CAISO problem. I think it's a problem that happened in every ISO.

And choosing best practices, and then really that technology piece. It's very complex and there's a massive amount of information that needs to be studied to do this correctly. And I just think we have to start leveraging, you know, computing power and AI to start doing it more efficiently.

MS. MOLY: There were a couple of recommendations, I think, that came up from Sergio and Rick about transparency with the timelines and with the PTOs, in addition to either incentives or mechanisms to ensure that those timelines are met. Can you guys expand on that a little bit more, and how you see that may work or, in your experience, why is that, I guess? How did you come to that conclusion as a recommendation?

MR. DUENAS: Yeah. I guess --

MR. UMOFF: Sure. Go ahead, Sergio. I'll follow.

MR. DUENAS: Yeah, just to add really quickly to that comment, I think something that we've seen that has worked and that is definitely beneficial and would like to see more of that is, for example, this quarterly transmission development forum meetings that the ISO has been hosting. That is definitely useful. You know, at times, we get very little additional context than the materials that are shared ahead of the call, but that's better than what we had before that was just notices of delays, if any.

I think it's important that we sort of think in a more innovative way, how do we actually incentivize performance? How do we make it so that either through positive or usually negative incentives, we get it so that

PTOs can find a timeline, at least, you know, propose that timeline, put it forth and seek to stick to it?

Communicating, like in the TDF, that's been very useful. Perhaps if there were, you know, like a circular rather than just like the quarterly meetings but, you know, a monthly memo of where projects are at, what's the cause of delays, that would be useful as well.

And, you know, as Jess said, everyone is sort of using the same equipment, doing the same thing all over. Having that information out there would be useful.

MR. UMOFF: Yeah, I agree with all that. I mean, I think one thing we hear a lot is better understanding the prioritization of upgrades. And also this point about sort of identifying needs that reappear, you know, cycle by cycle, I think that's also an area that we could get maybe some more efficiency, we could hone in on those.

And also, you know, I think from our perspective, you know, not to pick on the PTOs too much here, but if, you know, if there's a real problem with bandwidth, with resources, with human resources, capital, whatever that problem is, we kind of as a state need to know so we can deal with it.

And I think one of the challenges that we have is like the transparency and understanding like where are the -- what is causing some of these delays and what

is -- where are the bottlenecks? And I think we understand that's maybe a sensitive topic to kind of talk about openly. But, you know, if they can't get it done, you know, something else maybe needs to be done to make sure that can happen because, you know, this is now central. This interconnection issue is central to us meeting our climate targets, our reliability, our economic development. We've got, you know, what, half a dozen bills in the legislature right now focused on this issue at the distribution and transmission level.

And so, you know, sort of bandwidth constraints or, you know, we don't have the time or we're focused on other things, those kinds of, frankly, excuses just aren't going to cut it. We need to, we need to push through that. So you know, we need real continued attention from regulators and policymakers on this issue.

And we also, you know, need to have some honest conversations about what the limits are. And if that means we have to have some real creative solutions to breaking through some of these roadblocks, then that's -- maybe that's what has to happen because it's -- you know, they're too central to the success of this project at this point of decarbonization and really what is like central to our economy at this point.

MS. MOLY: At this point, I'm going to turn it to

Commissioner Monahan to see if she has questions, and the other Commissioners on the dais?

COMMISSIONER MONAHAN: Yeah, I ask everybody -- well, it seems like everybody's on video.

So I'm going to pass it to Elliot, the President of CAISO, for the kickoff questions and comments.

PRESIDENT MAINZER: Thank you, Commissioner Monahan.

So first of all, I wanted to really thank the panelists. You know, you guys, particularly folks on the developer side, I think it's always really, really valuable to listen to your perspectives because you're sort of living at that granular level and having to work your way through the processes and I understand and can relate to some of those frustrations. So thanks for the perspective and we really are looking forward to continuing working with you.

Just a couple of observations, and I also wanted to ask Neil, so first of all, you know, I think it's really important, maybe stepping back and remembering the big picture. You know, I've been around interconnection, queuing, planning issues for a long time. And I guess the basic conclusion that we've come to at the CAISO, and I actually think FERC is coming to, is that, you know, queuing is in some ways, it's sort of a symptom of a

different problem; right?

I think the solution that we're really trying to solve here is to do really outstanding, proactive, integrated power and transmission planning; right? We really have to have that forward. Look, we've got to. You know, transmission is such a long lead time infrastructure. You've got to work super closely with your state agencies and your utilities.

And, look, there's good information in the queue that can be -- that can inform your transmission planning. But at the end of the day, you've got to come out with a plan. You got to stick with it. And transmission planning needs to be, to need to be a leading indicator, not a lagging indicator. You can't be reacting to queues.

And so the first and foremost thing, we really through the 20-year outlook, and now through our zone Transmission Plan, really trying to give you guys that longer term look of certainty around where the infrastructure is today, where the infrastructure is going to be, and that's where you need to queue up because that's going to be where the transmission is going; right? That's the highway we're building.

And I want to, again, sanction that issue. You know, we want to work as closely as we possibly can with the PAC and the CDC and others. And we're going to do

everything we can as a transmission planning entity to come out with the best, smartest, least cost Transmission Plan.

But yeah, that then spending several years, you know, re-questioning it again, that, that is a source of frustration. So I appreciate some, some energy around that while also recognizing the importance of checks and balances and transparency.

On the deliverability of showing a trend, and I want to thank Nancy, you know, she's been a really strong advocate for this issue. And I know, you know, we all want to try to make sure we're making the very, very best use of our existing transmission capacity. And we definitely have opened up another round of conversation around that and we're looking forward to that discussion.

I thought it would be just useful just to take a minute or two for Neil, just to talk a little bit about the lens with which he's viewing that, because the way it's always been articulated to me, it's this balance between really leaning in, being willing to examine your methodology, second guess your -- you know, question your assumptions, but at the same time also trying to be really transparent and honest with people about when you get to the edge of reliability concerns.

So Neil, if you could just talk to that briefly and then we can open up some other questions?

I appreciate you guys raising it. It's an important issue.

MR. MILLAR: Sure, I'd be happy to, Elliot.

So, yes, there are a number of issues here where as time and fleet has evolved, we do see some opportunities to explore. We have, as Nancy indicated, we have announced that we're intending to move forward with a stakeholder process revisiting the entire deliverability methodology approach.

You know, I do need to remind people that the purpose of the deliverability process is to ensure that we're reasonably comfortable with resources that are qualifying for resource adequacy compensation can be called upon at times of peak system stress. That's the purpose. It wasn't designed as a barrier to getting generation, getting them contracts and getting them moving forward. And our goal here is to ensure that we can get the maximum amount of generation reliably connected that can meet those, that reasonable need.

So we are launching this process. We have seen opportunities that we want to pursue, as well, to explore. We also see some areas that are going to open up a much bigger industry dialogue about the concept of having local resource adequacy resources that are not also qualifying for system resource adequacy. Is that something the state

really wants to get into where there's an assumption that your system peak and your local peak will never coincide? So that's an area that needs some bigger discussions. It's not just an ISO methodology issue.

And then there are also some areas where we clearly see that additional education on our methodology is required, because I am concerned that some of the comments I've heard, especially the idea that we've actually been building transmission into the greater Bay area to make batteries in the L.A. **B**asin deliverable, but that there are some severe misunderstandings that we need to have a bigger discussion about. So we think the stakeholder process will enable us to get into all of those issues, and then also identify which are the ones that actually are more the genesis of a bigger policy discussion than perhaps a pure technical methodology review.

So I hope that just kind of puts it out there that we're certainly up for this discussion and looking at doing everything we can to facilitate getting as much resources reliably connected that can also be counted on to meet the purpose that we're, we're bringing them on the system for. So I hope that helps.

Thanks.

PRESIDENT MAINZER: Yeah. So thank you, Commissioner Monahan. I want to make sure the other

members of the dais have some opportunities for some questions and comments.

COMMISSIONER MONAHAN: Can I ask if any other members have questions or comments, just raise your hand. I don't see any quite yet, so I'm going to -- oh, Vice Chair Gunda.

VICE CHAIR GUNDA: Yeah. Thank you Commissioner Monahan. And thanks to everybody for the discussion.

I think I just wanted to ask a question around, as Neil kind of just mentioned, we are going to continue to evolve some of the processes and I think, you know, the problem statements that most of you raised.

I wanted to specifically hone in on, Rick, your comments on, you know, kind of the resources needed for getting some of the studies done.

And I think Jess, you pointed out a, you know, potential for using automation tools for the studies to be done. I just wanted to ask if there are any examples of that? I don't. You know, haven't heard them. I mean, this is a discussion we actually had with the IOUs on potential in automation tools for, you know, accelerating the studies, if you can comment on that, that'd be great.

MR. UMOFF: So I'll say, I don't have any specific recommendations at the moment, but I, definitely, I will follow up with some of those ideas. This is

something that has been sort of bubbling up in our conversations with companies. They've kind of been saying, why can't some of this be more automated? It seems like that is, we have a lot of pretty advanced technology tools these days and companies that process lots of data, it seems like we should be able to apply those tools here. But it's not, it's not something we've like really dug into. But I definitely wanted to put it on the table as something to be thinking about.

I don't know, Jess, if you've given any thought to any specific, you know, application.

MR. MELIN: No, I just have hired a lot of people that recently got their MBA and can't tell me they didn't use chat GPT to write some of their papers; right?

So the only specific example I know is working with Amazon cloud, but it's a bit, again, it's a bit of a black box. We submit our requests. It's dark for a year and we get an answer out. And I'm not an expert on what happens for that full year. I'm sure it's a lot of very complex iterations, but it seems like in today's world, we have to be able to do that faster. And I don't know if we open that up and let people see into the box and have ideas. I think, you know, ultimately, you know, a group of 20 is going to have better ideas than a group of one.

But what is that? What happens during that year?

And is there ways to make it happen more efficiently and more quickly with the technology we have today? I have to think the answer is yes, but I couldn't point to a specific without knowing exactly what those studies are. But it has to be -- this has to be a solvable problem with technology.

VICE CHAIR GUNDA: Thank you. And just, I think, a quick follow up.

Rick, I think you mentioned one of the things around, you know, potential cost share opportunities on network upgrades. Could you just expand on that a little bit?

MR. UMOFF: Sure. I think the idea there is in areas where we know network upgrades are really needed and we know there's a real benefit looking at the, you know, maybe, you know, looking at the costs and benefits and considering a cost sharing between, you know, with rate payers potentially, so you know, if the cost is the issue on the upgrade and we know the state knows there are certain areas we're going to need to do those upgrades, finding a way to socialize some of those costs to break through that cost barrier.

And I think we recognize that that's not going to be everywhere necessarily but, you know, there may be some upgrades where there's deliverability opportunities where, you know, they've reappeared over and over that it might be

worth honing in on.

VICE CHAIR GUNDA: Back to you, Commissioner Monahan.

COMMISSIONER MONAHAN: I'm curious if you have examples of this transparency that a number of you have asked for. Do you have examples across the country of a transparent process?

MR. UMOFF: I think this is a complaint that we hear a lot everywhere. I don't have off of my fingertips like an example of a really great transparent process.

I mean, I would maybe look to you, not to put you on the spot, Jess, but if you've interacted with other, you know, PTOs and other places where it's been easier.

MR. MELIN: No, I mean, quite the opposite; right? I'm thinking, you know, across the WECC with PacificCorp and MISO, that's kind of the issue across the nation, is you submit an interconnect request and then nothing happens for a while. And then you get a surprise. And most more often than not, that surprise is if you don't have a PPA, you're out of the queue, or if you don't have a permit, then you're out of the queue. And so there's these very draconian methods to reduce the queue size rather than push projects through the queue.

So I'm unaware of a transparent process that works well that, you know, they take a lot of input. And I

understand that; right? You know, one of the ideas that we've had, you know, as one of the larger developers is let us build the network upgrades, let us build the substation stuff. But I'm wearing my NextEra hat, not my FPL hat, because clearly the utilities need to protect their system and they can't just open it up.

So I'm unaware of a transparent process. I think there needs to be queue reform across the nation, Commissioner, and I think that's kind of the frustration with developers. And that's why you see 350 gigawatts submitted. Because the best way I could describe it is throw a dart, throw as many darts as you can, and when the lights come on, hope that you hit the target.

COMMISSIONER MONAHAN: So do any other members of the dais have questions for the panel?

VICE CHAIR GUNDA: Commissioner Monahan, if you're okay, I just want to, you know, use a little bit of time.

I think, specifically, you know, we have this issue of also rate impacts and affordability; right? So we are kind of talking about affordability, clean transition, reliability and equity altogether, and we want to focus on all those four pillars.

And when we talk about socializing costs, Rick, I think, you know, have you seen examples elsewhere, any

other place that has been trying to do that and incorporating that, and not just through ratepayer money, any other ways, you know, like incentives, or is there an opportunity for federal funding? You know, what do you guys think on those issues?

MR. UMOFF: Yeah, I don't have any at my fingertips but I'll definitely, you know, I'll definitely ask our team and see what they're seeing in other jurisdictions, if there are good examples of that and we'll definitely put some in comments.

You know, I think one thing about cost to ratepayer impacts is there's also the effect of waiting and how that cost ratepayers; right? I mean, one of our frustrations is that we feel like we're way behind the eight ball on transmission buildout and on procurement. And that has cost ratepayers money, and that will continue to cost ratepayers money because now we're sort of playing this catch up game.

And so I think that's another way to be as you're looking at this is, you know, delay is going to, in the long term, cost ratepayers, unless we all decide we're not going to do clean energy, which is not going to happen. So I just think it's important to keep that perspective and don't allow ourselves not to act where we know it's in the ratepayer's interest because of somebody's like near-term

cost concerns.

MS. RADER: If I could tag on to that?

I was glad to hear the discussion earlier about the importance of balancing area coordination. And the plan does include a potential subsea cable project jointly with LADWP. And because we're so far behind, you know, if that can be added to this year's Transmission Plan, it would put one more project on that long road to construction and would also act to hedge some of the risks of the other the other projects in the plan. So I think we just need to do as much as we can this year because we're so far behind.

PRESIDENT MAINZER: Commissioner Monahan, this is Elliot. I just, I'm not sure, well, certainly that conversation is certainly happening and we'll see where that happens.

But I just wanted to just maybe close with this to just sort of map out the sort of next six to seven months. I think the next six to seven months are going to be extremely consequential for these conversations. I want to make sure everybody knows exactly how this could play out.

So first of all, you know, mid May, we will be taking the 2022 to 2023 Transmission Plan to the California ISO Board of Governors for approval; right? That's 46

transmission projects. That's $9.3 billion worth of investments. That's probably the single largest tranche of transmission infrastructure investment we've seen in California in generations.

So getting that approved and then really quickly moving into mobilization to make sure, you know, delivery on that and everything from the evaluations, the permitting, the siting with CPUC, and the competitive procurement, dot, dot, dot, there's a lot to do, but we've got to deliver on that plan.

At the same time, the Interconnection Process Enhancements initiative that we're moving out on will be proceeding across the course of 2023. This is the place where we're going to get real about what additional interconnection reforms are necessary, honoring open access principles but, you know, continuing to recognize the transformational reform in a way that's synchronized with state transmission planning and queuing and procurement is absolutely essential. And as we've committed to, we're going to be willing to pop the hood and continue thinking about the deliverability methodologies as well so that we can make best use of our existing transmission capacity.

So over the course of the next several months, we should be able to get ourselves to December of 2023 and be able to step back and see, you know, what are the

additional reforms that we've put in place. And my hope is that we can get real alignment within the state, within the stakeholder community of the need to deliver. And we'll certainly take a look at, you know, automation tools for studies. I think that's right.

But I think the key thing we want to be doing is ask the right questions, get the processes synchronized effectively, use your infrastructure as efficiently as possible, and get real about what we need to build if we're going to onboard anything close to what's necessary for SB 100.

So that's the thought process here at the CAISO. We really appreciate the collaboration with everyone. We are deeply committed to this and we need to make real and tangible progress across the balance of 2023.

COMMISSIONER MCALLISTER: Maybe I'll just step in. Elliot, you sort of read my mind there with some of your comments. And I guess a lot of arrows are pointing towards this CAISO process. And I think a couple of people mentioned sort of, you know, there's a kind of policy, like I think Neil said it most articulately where, you know, actually there's the policy embedded in some of these technical processes really are policy calls.

And so as we work through the stakeholder process, it's certainly -- like my hope would be, and I

think it's kind of coming out in the discussion, that the actual policy decisions get surfaced so that they can be made. And so and then we could perhaps really have a much cleaner queue and more sort of forthright and intentional decisions about the prioritization within that queue.

I guess the question then would be, you know, that's going to have some winners and losers. And the process as it's been today has been sort of like, you know, projects are hanging out on the queue and the black box and sort of the answer pops out. But that's sort of de facto policy waiting for new information to come and kind of, you know, it's sort of messy. But I think, you know, is everybody kind of prepared to sort of actually live with the consequences of that more transparent process, I guess, would be my question? Because there will be some significant portion of the queue that sloughs off.

MR. UMOFF: I mean, I'll quickly respond to that. I mean, I think one thing we are telling our member companies often is, you know, with queue reforms comes maybe some hard choices, and you can't have it both ways. So that's how that goes; right? I mean, we want it to be as fair as possible. We want to recognize the different developers and we want open access.

But we also recognize the CAISO has to make some choices; right? And if you want to make some changes, that

could have some negative impacts on some developers and that's -- you know, hopefully it's guided by principles so it's not arbitrary and it's going towards a resolution of more efficient process. You know, but I think if that's where it's heading, people can generally get on board with that.

I also just wanted to quickly acknowledge to Vice Chair Gunda that I've got a few follow ups here, examples of transparency around the country, examples of application of technology to create more efficiency and socialization of network upgrade and transmission costs in other parts of the country. So I'll definitely follow up on those. And if there are other questions that you have that we think we may be able to help with, please don't hesitate to reach out. We can try to track down information for you.

COMMISSIONER MONAHAN: Alright, I don't see any more comments from the dais, so I think we can close this one up.

Just thank you for all your perspectives. This has been really informative, a good, you know, segue from the morning session, you know, when we heard for at least several of the utilities that there's a six-year wait period between, I mean, by the time, from application to actually having a project, and that only 20 percent or even less than 20 percent of applications resulted in projects.

So just if that isn't a really strong indicator that there's kind of room for improvement in all of this, so the suggestion about, well, how do we make sure that these are viable projects? And some of them will need maybe a more transparent way to sift through ones that are not moving forward.

So Heather, I'm going to pass it to you for just the next -- are we taking a break now or are we moving directly to the next panel?

MS. RAITT: It is entirely up to you. If you would like to take a break, we had scheduled taking a break now. We were going to take a 15-minute break if you'd like, or if you'd like to power on --

COMMISSIONER MONAHAN: Well, I'd ask the --

MS. RAITT: -- we can do that.

COMMISSIONER MONAHAN: -- the dais, would you rather just power through or take a break?

I'm sorry, what was that, Vice Chair?

VICE CHAIR GUNDA: I'm sorry, I meant to say a joke. We looked at your leadership.

PRESIDENT REYNOLDS: I second that.

COMMISSIONER DOUGLAS: Well, I'm inclined to power through, but that's -- I feel like the morning session was probably -- that was the longest one. This one is -- we just have one more and then we'll be done for the

day, so I vote for powering through. Alright, let's do it.

MS. RAITT: Alright. Well, thank you to all the panelists, and then I'll just turn it back to you to go ahead and keep it going.

MR. WENDER: Absolutely. I'll jump in and introduce our last panel, which will focus on recommendations for improving full grid interconnection timelines, improving transmission expansion and utilization. We'll have Will Gorman from Lawrence Berkeley National Lab moderate this panel.

And, Will, I'll turn it over to you.

MR. GORMAN: Great. Well, thank you, Ben, for the introduction, and thank you all for including me today on this very fruitful discussion. So as he said, I am a research scientist up at Lawrence Berkeley National Lab.

And I do have slides. I don't know if it's possible to go to the next one? Perfect. Looks a little faded, but that's fine. It's just the title slide.

So I'm one of the co-leads of our work on interconnection issues on the bulk power system at the National Lab. And before I turn it over to the panelists today, I was asked to set the stage a bit on our interconnection challenges, many of which, of course, we have been discussing since this morning. But hopefully I'll contribute more of a national context using data that

we've been collecting over the last few years at the lab.

Next slide, please. Great.

So I'm going to quickly step through a lot of data. And so it might be a little overwhelming, but I do encourage folks, if you're interested, either getting in touch with me or going to the link I include on this slide. But I'm going to be sharing graphs from Berkeley Lab's queued up report.

And on this slide, I want to make the point, which is a point that a few of the panelists from the session just before made, is that this problem is not just a California one. And so I highlight CAISO in these slides with a red box but, as I hope this chart shows pretty clearly, is that we've seen tremendous growth in queue applications in all regions of the United States.

The largest region, at least at this aggregation, is the non-CAISO West. And that growth, as we've heard today, has created significant workflow and workforce challenges across the nation, especially as we've relied on existing tools and administrative processes, many of which I think we're hoping to improve upon, but that is still a work in progress.

Next slide, please.

So to really drive that point home, we compared the queues in 2010 as compared to 2022 with the total

installed U.S. power capacity, and that's what you see in this graphic. And we're basically showing that proposals in the queue at the end of 2022 were almost double the entire installed capacity of the US power fleet, so that's pretty wild. The good news here is that more than 95 percent of that capacity is zero carbon.

Next slide.

Now, you know, if you're wanting to accelerate clean energy, that, of course, is a good news story. But we have also found, which is aligned with some of the statistics I think that were shared a little bit earlier, is that across the country, only about a fifth of these projects have historically been built. And unfortunately, that does vary regionally, of course. And you can see on this particular graph that CAISO is on the low end of that range with only a little more than ten percent being built.

And, you know, one consequence of those withdrawal rates is the need to restudy a bunch of projects that remain in the queue, and it increases a lot of uncertainty which, of course, leads to more people needing to apply to the queue because of that uncertainty.

Next slide.

So still, you might not think that this is necessarily the sign of a problem if the queues are operating efficiently, you know, moving bad proposals out,

getting good projects online quickly. But unfortunately, we are also finding that projects are taking longer to complete interconnection studies and connect, which does become a problem if we are trying to target specific timelines for getting clean energy connected.

So in this particular slide in the graphic on the right, in particular, you can see that CAISO is roughly in line with many of its ISO peers, but the study duration, so just the period not even necessarily getting online, but just that study period is creeping up to 40 months.

Next slide.

So given that today we're focused on California, I'm going to share another graphic that does start to get a little bit more in the weeds, but I think it's an important story to tell in the data that we have, is that we have found that since 2016, there has actually been a dramatic rise in the time from securing an interconnection agreement, so the time from application to doing the studies to securing that contract with the ISO to commercial operations, which suggests that the problem here might not just be solely the result of a challenging interconnection process itself, but also related to other challenges in the development process, such as securing offtake or siting permits, you know, amongst a number of other things.

And that's important context, I think, to keep in mind that there is not just the interconnection process when it comes to development.

Next slide.

So more evidence of a problem that we've seen across the country is that we are finding that the costs to interconnect are rising, and I think this is in line also with other comments earlier, that these are largely being driven by the expansion of bulk power network costs, so large-scale transmission upgrades that have been identified during the interconnection study process, and these high and oftentimes unpredictable costs can lead to higher queue entry, basically using the queue as an information gathering exercise, and then ultimately more withdrawals.

Alright. Next slide, and this will be my last before I turn it over to the rest of the panel.

So the last thing I wanted to do really is a little bit of advertisement for the Department of Energy program that has funded a lot of the work that I just shared, but it also gives me an opportunity to state that at the Lab, in the national lab ecosystem, we are trying to do more than just document the problem of the interconnection process. So the Interconnection Innovation Exchange, it's a national program funded by the Solar and Wind Technology Offices at the Department of Energy that

aims to enable a simpler, faster, and fair interconnection process ultimately. And there are really four key pillars of work. I've listed those on the slide here. I'm not going to go through each of them.

The data I just presented on is related to this data and analytics pillar, which really aims, and I think it will resonate with the conversation we were just having, it aims to increase the transparency of this process so stakeholders who are engaged here can make informed decisions, especially as it comes to comparing regions with each other.

But we also have a pretty robust stakeholder engagement effort that is trying to facilitate nationwide exchange of ideas and solutions and best practices, and that's a critical element of this work.

And then finally, we also plan to release a solutions-oriented roadmap sometime this year that will summarize/categorize the full suite of ideas and solutions that we've been collecting through this program.

Okay, so with that, that is it for my little soliloquy here. I'm going to move into introducing the speakers that will hopefully refocus us back on the California context. That is obviously the purpose of our discussion today, and then hopefully offer some solutions and opportunities to address the interconnection and

transmission challenges.

So first up, we have Michael Colvin, who's the director of the California Energy Program at the Environmental Defense Fund.

MR. COLVIN: Thanks Will. I really appreciate it.

So this work is presenting a paper that Environmental Defense Fund co-authored with Clean Air Task Force, and I list off our contributing authors here on the bottom of the slide.

If we can go to the next slide, please?

This is something telling you all something that we already know of how much of a leader California is and the size of the problem that we are facing.

Let's go to the next slide so we can start getting into the real substance here. And keep advancing, please.

So meeting California's clean energy targets is going to require a massive, almost unprecedented build out of the grid, depending on some of your transmission assumptions. If we have a regional market and a few other things, that number is going to be about 3 to 4X here in California on in-state generation alone over the next 20 years.

And let's go to the next slide, please.

And the amount of that new generation is going to be required, a lot of it is going to come from solar. It's one of the most cost-effective resources that we have, but when you look at how much solar we have been building since the start of the renewable portfolio standard, that's that bottom line in that bluish color, if you were to expand that out on its current trend line, we wouldn't meet our goals. We are going to have to cause a kink in that line to a larger amount than what we currently have. And depending on how much you want to do that by, you know, we're going to have to figure out how do we kind of get onto that higher trajectory.

I note that the more diverse the resource portfolio is, if you're as scared by those high solar penetration numbers as I am, just because we might not have that much land available to actually build that much solar, then we're going to need, one, more transmission to help move power around faster, and two, we are going to need signals for larger diversity of clean resources than what we are currently sending out into the market.

Let's go ahead and go to the next slide, please.

And so very similar to the story that Will just laid out for us, not only do we need three times the amount of generation, but we're going to need three times the amount of wires itself. That amount of new wire, in part,

is going to depend on how much intrastate transmission we are going to want to do versus how much interstate transmission.

Part of the modeling work that EDF did, both in this and another underlying study, assumed that we would be able to get to a western-wide regional transmission organization and still need a massive transmission build out. The numbers get even harder to fathom if you don't have that large amount of western geographic diversity attached to your scenarios.

And so one of the key underlying assumptions for the IEPR that I think we're going to want to consider is are we on that pathway of having the full geographic diversity of the west to help contain our overall transmission investment story, or are we trying to do this with a borders-only solution, knowing that California imports 30 percent of its power today and that we need a place to put a lot of our bulk excess power?

When Elliott was speaking on the last panel, I just couldn't help but be thinking about the sheer amount of curtailed power that California has. And if we had a market to really be able to put that on a long-term basis, we would be able to decarbonize the west even faster. So the amount of transmission that we want and that policy call that we need to make is going to be a really vital

assumption here.

We can go to the next slide, please.

And the good news is that we are able to do this. We are seeing some, you know, easy on-ramps onto part of this.

And if you can click next on the slide?

But we are going to hit eventually some sort of an S-curve where cost of land area is going to be high. The amount of landowners willing to have a right-of-way given up is going to get more contentious. Some of the capacity factors, the good stuff is going to get developed first, and so you are going to get diminishing returns both on your transmission capacity and your willingness from your local communities the longer you go. So we have to think through, how do we get as much of our development on the left-hand side of this S-curve as long as we can and reduce the barriers that are on the right-hand side?

Let's go ahead onto the next slide, please.

Will, I think, did a really fantastic job talking about the queues here. But, you know, at the risk of being a little bit of a downer, not only things take a really long time, but then there are delays on top of what is there.

And I say this as respectfully as I can to all of the Commissioners that we have on the virtual dais today,

but none of you have actually approved a transmission line that has then been constructed in California. When you look at the last major line that was built, none of you were in your current roles. We have incredible institutional knowledge both within the state infrastructure and you all have incredible depths of knowledge yourselves, but it just hasn't been done before, and now we're going to have to be doing it both for expansion of the existing system and new infrastructure sort of at the same time.

And so one of the stories to take away from here is coordination is going to be key, and two, there are going to be delays, even on top of the long timelines that you've talked about. This is the data to show that. And so the more that we can do tabletop exercises, the more that we can do sort of coordination amongst the various agencies to try and expedite how one part of the process flows into the other is going to be really critical to help shorten these unexpected delays as best as we can.

Let's go to the next slide, please.

This slide is standing on the shoulders of the Nature Conservancy's Power of Place work. And I believe Erica Brand is watching this or has certainly cheering us on from afar now that she's at the CEC. But when you look at the amount of total land that is available in California

for something, whether it is power generation or power transmission, it is not as much land as we think.

And let's go on to the next slide, please.

And so there is some land that is available that is suitable to develop.

Let's go to the next slide again.

But it's important to recognize that not all potentially suitable land is actually going to be able to be developed. And so as you sort of go down this funnel of what can be done and has environmental integrity attached to it, and then what can be done practically within that, is far less than the initial estimates might say.

The takeaway from this is sort of twofold. One, we have to get the best and biggest bang for the buck for every square acre of land that is out there when it comes to energy generation. And two, the more that we can help expand the developmental land into the suitable category, the more that we can help encourage local communities who might be reticent to do this type of development and the more that we can help give them the resources, the easier time we're all going to have.

Let's go to the next slide, please.

To give you an amount, now this is something the Clean Air Task Force and the EDF Commission, this is no one actual realistic project, but we are trying to say that if

we were wanting to build the amount of solar that we say we want to build, it would look like this.

And for scale, let's go to the next slide.

We are talking about something the size of Lake Tahoe. It's that order of how big we're trying to do.

If we could go forward one more slide back to 15? Thank you.

And so just to make home the point of we are going to need thoughtful planning and thoughtful deployment as best as we can.

Let's go to the next slide, please.

So as part of the report that we Commissioned, we did about 200 different stakeholder interviews across all forms of state government within each of the agencies. Several of you who are on the dais, we interviewed, and your staffs. We also talked with renewable developers, we talked with environmental advocates, we talked with local community leaders, we talked with local permitting offices, we talked with everyone, really trying to understand what was going on.

Thank you for the time check. I'm wrapping up.

And one of the things that emerged was everybody's in charge and nobody's in charge. And I have to give you all a lot of credit with your new Memorandum of Understanding. That goes a long ways of helping. But one

of the things that we recognize is that there's going to need to be somebody who is just point, on making certain that things are not slipping.

If we can go to our next slide, please?

And so one of the recommendations that we have is not a plan of the IEPR or the Transmission Plan or the IRP, those are all about sort of future forecasts and future needs, but a document that says, here's how we're actually going to deploy, here's the Gantt chart, here's the project management plan that has the specifics on the quantities, the locations, where we're going to do something, by when, who is going to do this, what happens if the PUC needs another six months because of something that happened with an ALJ, what happens if the ISO needs something because the batch server didn't work, what happens if this -- so just understanding the risk assessment and how things are going to flow from one to the next. So develop the actual deployment plan, what's getting built, where, when.

Have somebody quarterback that plan, have a place to help develop the dashboard to see how we're doing the progress. One of the things that we heard from the developer community was if they had better transparency and visibility into where they were at in the queue, it ends up lowering their risk and therefore lowering their costs. And so that level of transparency ends up being really

vital to understand if they're going to get built, if they're going to get selected, and it ends up making a huge affordability impact to customers.

There's a bunch of supportive policy that we can do to basically give local agencies resources for their end. And so one of the other recommendations that we had here, and this is this last bullet, is give local permitting entities and local communities the research ability -- the outreach ability, excuse me, to be able to do the engagement.

The PUC, for its part, does have an Intervenor Compensation Program to help. It's a little bit cumbersome, and I speak as somebody who does intervener compensation all day long. The Energy Commission and the ISO do not have that kind of a counterpart. And there aren't necessarily grants available to local communities to help them hire the experts that they need to hire or to understand what their desires are. And that's something that can be rectified.

If we can go to our next slide? I think you slid one up, but it had my contact info, and I'm looking forward to your questions. Thank you all so much.

MR. GORMAN: Great. Thank you, Michael.

So I will introduce our next speaker. We have Karen Wayland, who is the CEO of GridWise Alliance.

Karen, if you can unmute? And the floor is yours.

MS. WAYLAND: Thank you, Will.

Well, I'm going to go to the next slide then.

GridWise Alliance, for those of you who don't know, is a membership organization of utilities, of grid equipment manufacturers and vendors. We have three of the five RTOs, including CalISO. We have a number of consulting firms who work with the utilities on developing grid modernization projects.

So next slide, please.

We develop, among the other things that we do, we develop resources for state and local policymakers explaining the grid so that when you're making decisions, you know, you've got resources that explain to you what this black box of a grid is, what the kinds of technologies are that are going to be deployed on the grid.

One thing that you might find interesting and useful as you're thinking through your recommendations going forward is a paper that we did recently, *Near-Term Grid Investments for Integrating Electric Vehicle Charging Infrastructure*, which lists out the kind of no-regret strategy for technology deployment in this near term of addressing increased load and possibly sending time of use signals, but setting the stage for true vehicle to grid

integration and that kind of fully integrated DER onto the bulk power system.

We're currently working on a paper on the kinds of technologies that need to be in place for full implementation of FERC Order 2222, so stay tuned for that.

But what I want to talk to you today, and it's very convenient that I followed Michael -- next slide please -- because he talked about the difficulty in siting transmission, and we know that even if we had a perfect situation, we had, you know, the adequate land, we had a very streamlined siting and permitting process, it would still be hard to build transmission and it would take a long time.

And so how do we, the question is now, how do we maximize the performance of our existing tech -- sorry, I'm seeing you Will. Are you seeing me, my video?

MR. GORMAN: Yeah, I am seeing you. I can --

MS. WAYLAND: Okay. Alright. Thanks.

MR. GORMAN: -- take my video off. Yeah, your video is working.

MS. WAYLAND: So I came on late, so I apologize.

So the question right now is: How do we maximize the performance of our existing transmission? And for us, it's clear that we have the technologies to actually get more out of our system. And those are the hardware and

software that we're calling grid-enhancing technologies that will increase the efficiency, capacity and reliability of both the transmission and distribution system. But since we're just talking about the bulk power system in today's workshop, I'm just going to focus on the transmission system.

So these grid-enhancing technologies, or GETs, are faster, cheaper, and they're modular solutions to the transmission congestion that we're experiencing now. And the installation and payback time is significant. Installation is less than a year. And in some of these projects, the payback period can be less than, you know, on the order of just a couple months. So they are modular, they can be removed and replaced and moved around the grid depending on where the constraints are, and they're reversible.

And one of our members, VELCO, in Vermont, which is a transmission, you know, builds and owns transmission, said that for them, they view GETs really as a critical part of an overall strategy to build new transmission, because you need to show the public that you have done everything you can possibly do to get the capacity of the existing transmission system before you ask to go through the difficult process of siting and permitting new transmission.

So next slide, please.

So what are these GETs, these grid-enhancing technologies? There's a number of them. There are generally three categories that I'm going to talk about. But we shouldn't forget that storage, demand response, some of the things that we know, help us give flexibility to the grid operators are out there already. So I really want to concentrate on the kind of new technologies that have been developed that are online. They're frequently used in Europe, less so here in the United States, and we'll get to that reason later. But the three I want to talk about are demand line rating, power flow control, and topology optimization.

So if you think about how grid operators manage the flow of electricity, they're moving electricity around to meet load and dispatch conditions. And they move that electricity around the grid within the physical limitations of the transmission equipment, which is generally limited by thermal conditions. And you want to avoid equipment failure by keeping the lines, the conductors, the transformers from getting too hot and failing.

And in the conventional practice, we'd have a single static thermal limit, and that's the blue line on the bottom there, where you look at the hottest, sunniest, driest day with the least amount of wind in a particular

location, and you say, that's our thermal condition. We will not push any more capacity onto the equipment than what will overheat on this extreme day.

And what dynamic line rating does is give you the ability to vary capacity of that line based on real-time conditions. So you're using hardware and software, mainly sensors, to give you real-time information about wind speed and direction, solar radiation, temperature. And the safety of the lines then becomes based on the true conditions. And what that ends up doing is allowing you to potentially, in some instances, use past 50 percent more power across these lines in some conditions.

And so what we are seeing is that dynamic line rating, and the same is true for transformers in terms of that physics, the physical limits, but for line rating, it leads to a more cost-effective generation dispatch. And then if we get to renewables, it actually will help enhance the integration of large-scale renewables onto the California grid because it can reduce the amount of curtailment of renewables to avoid -- excuse me -- grid congestion.

The next one that I want to talk about is the power flow controls, which is basically advanced grid controls that can adjust the resistance across the grid to change the flow of electricity, and that can happen

manually or automatically, and moving away from congested lines. So you're actually just moving power across the system in a much more efficient way.

And then that ought to be paired with topology optimization, which is like what we envision Waze for the grid, you know, Waze the highway navigation system. And this is software that combines generation, demand, grid conditions across the grid to evaluate the best configuration for moving that power flow to maximize capacity.

So next slide, please. Thanks.

I will note that just recently, in the last couple weeks, Brattle just came out with a new report, which I think you'll find very useful, *Building a Better Grid: How Grid-Enhancing Technologies Complement Transmission Buildout*. And what they did is they looked at how you can deploy grid-enhancing technologies and the benefits that they can provide not only to the existing grid, so that before you're building out new transmission, but during and after construction.

So all the way through the cycle of transmission, you can deploy grid-enhancing technologies to get not just the operational benefits of, you know, reducing equipment failure and outages, but economic benefits. Because what happens with congestion is that when the grid is congested,

you can't move the cheapest electricity to the customer. You have to move what can get around the congested areas. And so if you can use grid-enhancing technologies, you'll see real economic benefits of reduced congestion.

It will provide additional visibility during extreme weather events, reduce the impact of outages, and avoid outages during transmission construction. When it's incorporated into new transmission projects, you'll get that enhanced value in new transmission so that your future capacity is maximized and you'll have less congestion. And it will, therefore, lower the overall cost of the transmission buildout and reduce the risks faced by developers and owners.

The next slide, please.

So we know that there are barriers to adoption. Otherwise this widely used technology in Europe would be more widely used here in the United States. And one of the biggest problems is, that I mentioned before, that the cost of GETs are relatively small compared to the cost of a large capital project. And as you know, most utilities, or the IOUs at least, are looking at the return on their investment, and that's driving some of their investment decisions.

And so one of the recommendations that we would make is that as you consider performance-based incentives,

you should think about how you can develop them to drive more adoption of GETs. You can consider GETs in state regulatory proceedings, so you can require that, you know, as you're looking at a grid modernization proceeding that comes before you, you ought to ask whether GETs have been considered.

You could look at some of the funding that you're getting from the federal government in terms of the resilience money or from your state coffers, and you could direct funding of GETs through grid infrastructure investments. You can look at how the RTOs and ISOs are doing their planning and make sure that GETs are included in that level of planning. And also, you could encourage renewable developers or you could create requirements that during a clean energy interconnection process, GETs are considered as a way to alleviate some of the congestion or curtailment that can happen in congestion.

So I think that is it.

Can we go to the next slide?

And that's it. Record time to give you some extra time back.

MR. GORMAN: Great. Thank you so much, Karen, really informative presentation there.

And so finally, last up on this panel, we have Ed Smeloff, who's a consultant with the Center for Energy

Efficiency and Renewable Technologies, as well as GridLab.

Ed, the floor is yours.

MR. SMELOFF: First, unlock the unmute. Good afternoon everyone.

And I'd like to thank Commissioner Monahan for organizing this excellent forum, a lot of good sharing of information, and thank the Energy Commission staff for putting it all together.

I'm Ed Smeloff, and CEERT has been organizing meetings over the past year, so every two weeks to discuss transmission planning, transmission expansion, and interconnection. We've engaged with a lot of the trade associations and environmental groups. And out of that, we produced a report on transmission for California. It's currently on the GridLab website, gridlab.org. GridLab's a nonprofit organization that provides assistance and technical advice to advocacy organizations across the nation, and we appreciate their support. I've been supported by them in working with CEERT.

So let's go on to the next slide.

One of the advantages of being the last person on the agenda is that everything that's important to be said, or not everything, but most of what's important to be said has been said, so I won't repeat it. A lot of this was provided to you by Shannon Eddy and the CAISO and others.

I do want to make a point of pointing out this graphic here, which shows that we were in a valley of not building transmission for about a decade. We did do the Tehachapi Regional Transmission Project, which I think was a big success. It drove a lot of development of wind and solar in California, a lot of the solar companies that grew in California as a result of that project and having the gathering substations available in the high-voltage backbone system that was developed by Southern California Edison. But we did go through a valley of non-development, partly driven, I think, by our view that there wasn't any load growth in California.

Well, we've turned the corner on that. The CAISO deserves a lot of credit for doing that beginning last year in the '21-22 Plan. They identified a couple of new large 500 kV substations in the Delta and the Central Valley, which they put out and it went out to bid and selected, you know, a competent developer, so that's underway.

This year's plan, which is about ready to be adopted, the '22-23 Plan, is really aggressive. It's, I think, as we've heard from Elliot and Neil and others, it's a real groundbreaking plan that identifies 46 projects, $9.5 billion. This will build up reliability and will enable us to do a pretty aggressive reduction of greenhouse gas emissions.

But there are some obstacles, and I will kind of mention a couple of issues that I think haven't yet been fully delivered or discussed in this forum.

You know, I think one that has been partially discussed is we really do need to pay attention to permitting. That's going to be the gating item for getting these projects done. It's not going to be easy for the state to permit 46 transmission projects, so we need to think about reforms that can enable those to get done more quickly than has happened in the past. Michael pointed out, you know, what our track record is. It isn't enviable. So, you know, we need some reforms.

One of the possible reforms is for those projects that are on existing transmission rights of way, let's minimize the environmental reports and impact statements that need to be done. We don't need to short-circuit a detailed environmental process on new greenfield projects, but we need to have the CPCN process and adequate staffing available at whatever agency, the Energy Commission or the PUC, so that we can get the permitting done in time. Because, you know, it's important to identify the need to pick out the projects, but we need to get them permitted and then built.

Let's go on to the next slide.

So the next slide also copies a slide you've seen

before, but I think it's worth looking at again, and I just can't highlight how important it is. What the CAISO has done by taking a zonal approach to transmission planning and linking it to the interconnection process and using it as a guidepost for the load-serving entities to do procurement is really important. We need to build on it. We need to really get this understanding that California is doing things differently with a zonal focus on transmission. We're going to go to the resource-rich areas of the state and develop the transmission that's necessary to bring those resources into the load centers in the state.

There's 22 policy-driven projects. Four of them are going to be competitively bid, and I want to mention a little bit more about that in the next couple slides, but we're seeing, really, development from some of the important areas, resource-rich areas in southern Nevada, western Arizona, the Imperial Valley, Riverside County, north of Lugo, so we are doing a lot to bring in new resources from the resource-rich areas as part of this zonal process.

But there's still more to be done. The '23-24 Transmission Plan, I think, will be equally as important as the '22-23, because there still are some real challenges in the state, overcoming the north-south, you know, congestion

that occurs on Path 26, you know, advancing.

One of the things that CAISO did, which was really groundbreaking, was they did an analysis of what it would take to reduce dependence on the Aliso Canyon Gas Storage Facility and to reduce the need for gas fire generation in the L.A. Basin. And a large part of the answer is we need more transmission into the Los Angeles area. You know, Path 26 is a pretty robust path, but it does get congested, and we need to overcome that.

So there's an opportunity, I think Nancy mentioned this, and perhaps extending the '22-23 so we can do the collaboration that needs to happen between LADWP and the CAISO and advance the subsea cable that will bring power from the north into the L.A. Basin.

I want to go now to some Google Earth slides, so let's pace on to the next slide.

I think it's useful to kind of visualize the distances and the, you know, magnitude of the transmission projects that are being recommended in the CAISO plan. These are some long lines. A couple of them are going over green fields or going over desert that is, you know, uninhabited and in some cases are very sensitive habitat. And we really need to get this process right and do it in a way that engages local communities, engages tribal communities and disadvantaged communities, particularly in

places like Imperial County where we're going to do quite a bit of transmission development across into San Diego.

So I want to point out, and it's sort of an interesting recent development, so one of the projects that was recommended is the 500 KV line from the Trout Canyon Substation, which is in southern Nevada down to the Lugo Substation in San Bernardino County near Hesperia. And that's a line that will enable us to bring in quite a bit more power from southern Nevada and then ultimately wind generation coming in from Wyoming and Idaho.

However, what's really interesting is, and I think a very positive development, was just recently a developer put forward an alternative to this project, which would be the conversion of a 500 kV AC system to high voltage direct current. You know, we heard about GETs technologies. This is one of the technologies that I think is going to give us a lot better control over the system.

So there is, and I'm hoping and I'm expecting that the CAISO will evaluate this alternative. It goes from the Mead Substation, not too far from the El Dorado Substation and not too far from Hoover Dam over to the Atalanta Substation. It goes on an existing right-of-way. To the extent that we can use existing right-of-ways, expand the capacity on those rights of ways by converting from AC to DC, we should be looking at this. And this may

be one of the opportunities to do that.

The other project that's going to be challenging for us is to get power from the Imperial Valley Substation just outside of El Centro all across the coastal mountains up to a brand new substation north of the San Onofre Nuclear Plant north of SONGS. There's been some efforts to chart transmission through these areas. I think it can be done. We need to pay a lot of attention to the land use and environmental issues.

I know WECC has developed some overlays. It would be useful for the CAISO and others to use the WEC database and understand very precisely, even before the bidder, the developers selected through competitive bidding, understanding what are the issues and what may be the ways to minimize impact on the environment. It's really important that we do this well because this project that goes from Imperial Valley to north of SONGS really does loop the system together, provides a lot more reliability, and an opportunity to bring in quite a bit more clean energy.

Let's go on to the next slide. This one I'll spend short time on.

The next slide is the projects in the SCE metro area. These are important to get right as well. These will probably be part of SCEs. And we need to figure out a

way to do this cost-effectively. I know the PUC is, you know, focused on affordability. These are significant projects in an urban area and we need to figure out ways that we can do them cost-effectively, perhaps by enhancing credit and using federal funding to do that.

Well, let's go on to the next slide.

I wanted to do a little bit deeper dive on the transmission -- on the interconnection queue and focusing it on, you know, where are we seeing the interconnections? I haven't looked at Cluster 15, but I went and looked at the queue up through Cluster 14. And you can see that, you know, like many things, they're concentrated in specific areas of the state, specific counties.

Five counties, you know, have a lot, the bulk amount of the interconnection requests and capacity that's being requested for interconnection. And they're where you would expect, where you have a lot of solar resources, some geothermal resources that can be developed. So, you know, you're looking at Riverside, San Bernardino, Fresno, and then the Central Valley, Fresno, Kings, and Kern County, the lower Central Valley.

Let's go on to the next slide.

I think it's pretty informative. So we saw a lot of development in Southern California, and that's appropriate. There's a lot of resources in Southern

California and adjacent states that can be brought in. But there's an enormous resource in the Central Valley and an opportunity to develop solar and, you know, paired battery storage as a way that's beneficial for the local communities there and is a way to get the resources that can be delivered north and south up to the Greater Bay Area or into the L.A. Basin.

You'll notice here that as you look at what's in the queue, we're seeing a lot of hybrid projects. This is something that's developed over the last three or four years. And we think there's a real advantage, particularly in the Central Valley, where you're going to need to use your storage to get the power out during peak conditions that can be challenging.

So I want to go on to the next slide, which talks about the need to focus on the '23-24 Plan on the Central Valley.

So the Central Valley has a large backbone transmission line, Path 15, which goes from the Tesla and Tracy substations down to the Gates and down to Midway. And the 20-year transmission outlook did a look of an enormous quantity of potential projects, renewable projects in the Central Valley and identified a lot of system overloads and a need for additional transmission in the Central Valley. It didn't show up in the '22-23 Plan in

part because the base case scenario that came over from the PUC was less than the sensitivity. The sensitivity is, almost, it's more than two times the amount there. So as we push the limit of what we can get there, we're going to have to do more transmission in the Central Valley. And here are some of the projects that were considered in the 20-year outlook.

So let me move on to the recommendations that we came up with in our transmission report, the CEERT Transmission Report. And I know some of these may be pushing the envelope, but they're on the next slide, if we can go on to that? If we can go on to that? There we go.

So again, I can emphasize how important it is to educate the developer community around the zonal focus, the geographic focus that's being used now by the CAISO. It's really transformative. It's a sea change in the way we're doing. We're leading with transmission. That's the way it should be. And the developer community needs to understand that it's a great opportunity, but they need to understand what it is and where the zones are and where they should be getting site control and developing projects to go into the future clusters of the queue.

But we do have a problem right now. Everybody agrees that the queue is way too big. And Elliot made a really compelling point that we're doing these studies that

are not actionable. They're being done to comply with the tariff, but they use up a lot of resources, and we're not getting anywhere by doing that. So we need to have some carrots and sticks to be able to whittle down the queue.

A lot of it can be done, hopefully, by education. We need to encourage, you know, interconnection customers to go to the zones where there's going to be capacity. And that just is outreach education. Perhaps some incentivization of that by, as we do the system impact studies and facility studies, that we prioritize those that have gone to the locations where we have available capacity on the transmission line.

We do need to have some headroom. We do want to use competition as a way to allow load-serving entities to select the best project. So there does need to be some headroom on that, and more interconnection requests than actually will get built, but not the magnitude of what we have now.

The stick is a little bit harder. I mean, maybe we need to have some tough love during the scoping meetings and tell the interconnection customer that this just is not a good location. You're not going to like the results, so you may want to go somewhere else.

And then maybe even some harder screening criteria like project, some sort of viability calculator

where you're looking at site control and progress in the land use permitting process, and maybe even some early down payments on equipment orders so we can see who are the serious developers and not those just throwing darts on the dartboard.

So I'm looking forward to the enhancement process, the interconnection enhancement process. We're going to need both, you know, carrots and sticks to get it done.

We heard about busbar mapping. So the 20-year outlook really did, I think for the first time, take a hard look at commercial interests and where are the developers going and map the busbars, map development to the busbars. Where there is commercial interest, there obviously has to be screening for environmental issues. We need to update the busbar mapping based on Cluster 14, Cluster 15, and have this be an iterative process. Plus we need to have, you know, the look at what are the environmental impacts of going to specific locations.

As I mentioned, I think we're going to need to prioritize transmission development in the Central Valley where there is significant commercial interest, as I showed in the previous slides. More capacity is needed between the North and the South, which is a reason for the subsea cable that can alleviate congestion, as well as bring power

from offshore wind and Central Valley solar and reduce the use of gas in the L.A. Basin.

We're real pleased to see that there is now a high voltage DC line that's being proposed in California over considerable distance. Will, your colleagues over at LBNL have been thinking about this issue and researching it. And they're coming out with, I think, a report soon, talking about the potential for reconducting and actually just straight on conversion of AC to DC lines in California and elsewhere. This would be a very useful issue in the IEPR for the CEC to investigate: How can we advance this technology, which provides a lot more capacity, can use existing right-of-ways, and provides, actually, more control, voltage control? We heard you can change the induction levels on the DC lines.

And then lastly, I'll just repeat what I said earlier, which is we need permitting reform. I know it's being investigated over with the legislature. There may be ways at the PUC and elsewhere that we can advance permitting reform even without legislation.

So I'll end it there and be glad to take questions.

MR. GORMAN: Okay. Great. So correct me if I'm wrong, but I think I have 10 to 15 minutes for moderated discussion before I turn it over to the dais. So I think

if Karen and Michael want to turn on your videos, great. So with that, I guess I'll kick it off and you all can tell me if I need to turn it over the dais sooner than I do.

So at first, I want to start with a topic that I think wasn't really the focus of a lot of today, which has been on the much needed development of transmission with the state -- within the state, but I want to think about how we should be thinking about interregional transmission development. I think, Michael, you raised this topic at least a little bit in your presentation, Ed, also with the recognition of SunZia and TransWest.

And so, you know, I'm wondering from you all, I think there's a sense that we need to encourage more, but, you know, if you could talk a little bit about how much more, how do we get it done if we do in fact need it? What are those key barriers? Just a little platform to talk a little bit more about this interregional issue.

MR. SMELOFF: So another thing that the CAISO is doing well is this new model for a subscriber participating transmission owners. And we see interest from TransWest Express and from Sunzia. There may be other developers that are interested in this. As I think was mentioned earlier, SWIP North is still being investigated and could be, if there's economic interest on part of load serving entities, that might be something that's put into the

revenue requirements for California.

You know, absent an RTO, we are only going to be able to do some piecemeal things that can benefit California, certainly, you know, the subscriber model benefits. But if we really want to optimize future transmission across the West, we need to plan across a larger base of load. And, you know, it's challenging, but that's the way to optimize future transmission is to think about how do we serve the West in the most optimal way.

But absent that, and before that, the CAISO is doing the right thing with their subscriber transmission model.

MS. WAYLAND: Well, I couldn't agree more on the need for a Western RTO. And I think that the tide is changing a little bit, but I think there's a lot more work that -- I'm sorry, my dog is behind me, making a lot of noise here -- but I think there's a lot of work that still has to be done to convince a number of the other states that will be part of a Western RTO that it will benefit them. And I remember a few years ago -- I think California is doing a very good job in terms of starting to commission the studies that will need to show these other states that they benefit and it's not just California.

But I'll leave you with an anecdote that somebody from one of the northern states, a state energy offices

told me one day, he said, "If we're just going to join a Western RTO to eat the California duck, I'm not interested."

So I do think we know there will be regional benefits, but we do have to do a lot of work to convince people and to show them what those benefits are.

MR. COLVIN: Well, one, it sounds like Karen's dog also agrees we need a Western-wide RTO, so, you know, good doggy.

I think the question is not if we need this or not. I think it's going to happen. The question is: By whom and on what timeline? And I think what I get the most concerned about is what is going to be the best position for both decarbonizing the West in the most affordable way? And what's going to ensure that California has the right seat at the table at the right time?

When you look at where the solar generation potential is going to be, when you look at where the offshore wind is going to be, when you look at where the geothermal is going to be, California is rich in all of those resources, we're going to need a market to be able to put them in places because we are over generating and have very weird capacity prices and very weird curtailment numbers right now. But if we are going to be building out at the 3 to 4X scale that we are talking about doing so

without the geographical diversity of the West for that last five to ten percent of the grid, I get very, very nervous about both reliability and affordability concerns without that Western interconnect.

Again, I think that it's going to happen eventually because we are going to need that market eventually. It's just if we act sooner, we are going to have much stronger hand on the wheel. If we join an already established market, then we are having to bend the California policy agenda as something that we might not want to be doing.

MR. GORMAN: Great. Thank you. Thank you all for those comments. I'm going to keep us moving.

So now I'll go back to intrastate, so thinking about California. So Karen, obviously you mentioned a number of opportunities to increase the deliverability of the system somewhat as it stands today. And then Ed, you know, you mentioned a few more. I wonder if you all have seen, and this might be an impossible question so feel free to demur it, but do we have a sense of how much transmission those types of technologies might be able to avoid?

You know, we're talking about a massive build out, you know, Michael just said 3 to 4X of transmission. We have the CAISO plan, you know, that we've seen today.

Do these technologies take away half of that need? You know, kind of what are we what are we talking about in terms of its substitutability?

MR. SMELOFF: Will, we're looking we're looking to LBNL to help answer that question with the study you're doing on DC conversion. We know that this this project is being proposed on a 500 kV AC line from Mead to Atalanta will more than double the capacity on that line.

So the DC conversion is a big, big part of it, as well as the other technologies, the dynamic line rating and things that Karen mentioned.

MS. WAYLAND: Yeah, I'm going to leave it at that because we need studies.

MR. COLVIN: The one thing, to just share an anecdote in 2011-2012, I was fortunate enough to be on staff at the PUC and I was working for the lead commissioner who was assigned to energy efficiency. And even back then, which was more than a decade ago, we were approached with the question of, well, could energy efficiency fund some of these grid side efficiency technologies to make the grid better to go after the line losses? And the way that the portfolio and everything else was structured at the time, we just couldn't modify the public goods charge to make that happen.

But it's something that I think has stuck with me

ever since, which is where's the right way to charge ratepayers for it? Is it being done out of TAC? Is it done out of an efficiency bucket? Is it done out of something where everybody's going to benefit from having a more efficient grid? Who's going to pay for it? Because there's a lot of those types of cost allocation questions that pop up.

And I think if there are ways to assign both the need for the study of showing that everybody benefits and then also showing, and here's how these technologies are going to displace new investment, I think you go a much further way of showing then, okay, the cost responsibility should be done on a non-bypassable basis or on something that is more prorated. And so as we are figuring out how to do this, I would encourage the cost allocation question to be sort of aligned with the benefits that we receive.

MR. SMELOFF: Well, Mike, I'll just add to that. I think somebody mentioned storage as a transmission asset.

MR. COLVIN: Yeah.

MR. SMELOFF: And I know that storage has come up as part of the transmission planning process. We do, I think, we'll need to figure out how the cost allocation occurs between the use of storage as transmission, perhaps the use of storage as, you know, a way to arbitrage and load shift. But I think that's a good start.

And then there's a lot of work that needs to be done and demand response. That I guess is a topic for the next workshop.

MS. WAYLAND: Well, it is a topic for the next workshop but I think it's really important to think about what FERC Order 2222 is going to do, which is to pull all of these aggregated, you know, distributed distribution system resources into the bulk power system. And we can talk about it in the next workshop, too, I plan to, but I think it is. When you talk about the modeling that has to be done to tell you what resources can provide the kinds of services that you would expect from a new transmission line, you've got to think about where those aggregated, distributed energy resources are going to end up, too.

MR. COLVIN: Yeah, well, but I fully agree, again, with everybody, with what everybody said.

I guess one last point. I don't think that we are talking about, oh, we're not going to have to upgrade the transmission system if we do all these in near-term upgrades. Like it is not going to move the needle that much. But we are going to need everything in our arsenal in order to hit the goals that we say that we want to hit.

So we should do all the expansion of the existing system, and we should do the upgrades, and we're going to have to do parallel tracks. We should do the improvements

that Karen outlined. We should do the improvements that Ed outlined. There are probably people watching this webinar that say, oh, if we just do a lot of distributed energy resources, that will defray it. There are going to be other people who are going to say, oh, if we have a Western-wide grid, that's going to defray our transmission costs. The truth is that we are going to need all of these solutions stacked on top of each other.

Coming out of the California energy crisis, we created the Energy Action Plan, which had the loading order. And I think one of the things that the IEPR in particular can do is to provide, here's the vision document of how here's all the different things stacked together in terms of cost effectiveness and timeline, so that way we know here's where the first investment dollar is going to go and here's where the next one is going to go, but they're all going to need to happen.

MR. GORMAN: Yeah. No, I couldn't agree more with the all-of-the-above approach for sure.

So given I know, you know, it's been a long day, we're at the end, I will ask one more question and then we can turn it over to the dais to ask questions they have of their own.

And so for this last question, I want to turn a little bit more directly to the interconnection and

transmission planning process. And this speaks, I think, a little bit more to, you know, your presentation, Ed, but you know, Michael and Karen, you might also have comments here. And so, you know, we've talked a lot today about this historical disconnect between the interconnection process and transmission planning, and there seems to be a lot of strong momentum about what ISO is proposing in terms of these zonal zones, zones that will kind of incentivize where developers should connect.

But I do wonder, and this is what my question is about, is that obviously provides maybe stronger guideposts for developers than has happened in the past. But what happens when those zones themselves become oversubscribed? So we point this interest to these areas, and so developers reasonably flock to those places. You know, I think Neil had an anecdote earlier in the day saying that, you know, one substation had a crazy amount of gigawatts being subscribed. You could envision a similar situation here, which doesn't necessarily avoid this single file queuing process.

And so my question really is, you know, even with this zonal approach and this, you know, more integrated interconnection and transmission planning process, do you guys have thoughts on how to more fairly screen out requests? You know, you talked about the stick.

MR. SMELOFF: Well, as you go to zones, Will, you know, there's obviously a constraint on how much land is developable and how much of it is, you know, close to the point of interconnection, how long your gen tie has to be. So part of the screening process, I think, needs to be a much more rigorous look at site control. Right now it's possible to, you know, make a payment in lieu of site control. And that, I think, particularly, you know, probably for storage, it's easy to throw a lot of darts.

But if you have to demonstrate that you made an investment, then you're kind of de-risking the development process, then that, I think, it will act as sort of a natural, you know, streamlining or screening of applicants that are coming into the interconnection queue. And then as you go forward, you know, going from, you know, the System Impact Study to the Facility Study, you do, I think, need to make some reasonable demonstration that you're proceeding as well on the environmental permitting process and that you're making commitments on long lead equipment, et cetera, et cetera. There's a lot of things. And I think this will come out in the interconnection process enhancement, what are reasonable criteria that can be used to narrow the funnel on the queue.

MR. GORMAN: Karen and Michael, if you don't have any comments, it has been 15 minutes, so I will stop my

portion of the moderation and I'm happy to open it up.

MR. COLVIN: Just upload everything I'd said. A

COMMISSIONER MONAHAN: Alright, I'll ask all my members of the dais to come back.

And Elliot Mainzer had to leave, but Neil Millar, I know, is available.

And Neil, do you want to hop on video? You're welcome to but you're not pressured to do that.

So just again, raise your hand if you had any questions.

I'm wondering, I just want to ask one question of Karen, it's the first time I've heard of GETs, and I'm just curious about the data on some of the benefits. You make it sound very attractive. Is there any quantification of how much money has been saved in, I guess, it's the EU?

MS. WAYLAND: There are. Yeah, I will get you some reports. In preparation for this, I was looking at an IRENA report, you know, the European renewables, that did a whole, it's like 120-page report on dynamic line rating. So I can pull together some resources for the public record for you.

COMMISSIONER MONAHAN: That would be great. Thank you.

And then, Will, I'll ask you a question, and then I'll pass it to other members of the dais. So I'm curious,

the DOE innovation interconnection, I forget what you called it, something special, will there be any California-specific aspect of this, or is it sort of like national writ large exchange? I mean, because California, we're all facing similar issues.

MR. GORMAN: Yeah, so that, I mean, that's where I was going to go with this last point, is that we are not doing any type of region-by-region segmentation in the work necessarily, so there won't be specific, you know, recommendations for PJM as compared to ISO New England, as compared to CAISO California. But I think the hope, and it really is our experience that, you know, the issues that California is facing, you know, this state might be more advanced. You know, it's further along in its transition as compared to some other regions. I mean, you see that especially with the solar penetration, and that's only expected to grow.

And so I think because of that, or I guess because other regions are going to catch up, that this problem of interconnection is not going to be one necessarily unique to California, even if the conversations are happening more so in California today than in other regions.

So, you know, our hope is that the solutions that come out in the reports and our conversations are

applicable to a wide variety of regions, because we think that they are not really state specific per se. Obviously, there are nuances to each state, and there's different laws, you know, and regulations that affect different areas, but we hope it's more universal than that.

But I guess the short answer is no. You know, we're not going to have this great California-focused report. But we do hope that our recommendations are generalizable.

COMMISSIONER MONAHAN: I don't see any hands raised, so I'm just going to continue until I see one, or somebody.

Oh, actually, Vice-Chair Gunda.

VICE CHAIR GUNDA: If you want, you should go. I'll go after you.

COMMISSIONER MONAHAN: Well, this will be a really fast one.

I'm wondering also, Will, on that map that you showed of the projects that applied for interconnection and why, you know, California was kind of, I would say, commensurate with the West in terms of the number of other share of applications that actually made it into a project. What is unique about the Western United States?

MR. GORMAN: Yeah, again, at this point, I would be speculating a bit here, but I think it might somewhat be

related to my earlier point, which California, and the West generally, was earlier in the development process of solar and the smaller interconnecting resources. And so the statistic that I shared there is focused on projects that applied for the queue between 2010 and 2018. And we do that because, obviously, there's active projects trying to work their way through the queue that may be entered in 2018, and we don't really want to include that in that percentage because they might come online, ultimately.

And so then if you think about, you know, I think a lot of these challenges are renewable-related, given the locations where renewables are getting sited, they're also smaller, that you could see the West having a worse statistic kind of based on when we did that calculation, only related to the fact that they have been earlier in the game a little bit, to that solar development, I think, in particular.

But that's somewhat speculation by me, but it probably tells at least part of the story.

MR. SMELOFF: Will, are you seeing/did you look at the size of the projects that are seeking interconnection? It seems to me, from looking at the current queue, that we're seeing larger and larger projects now submitting interconnection applications, interconnecting at 230 and even 500 kV.

MR. GORMAN: Yeah, we've done a little bit of that, like we looked at that same statistic on a capacity basis rather than a project percentage basis, and the number doesn't change that much, but that's the national statistic. We haven't done that by region. But we could, of course, you know, do that type of stuff. We're always looking for new ideas.

Again, our goal with that particular project is transparency; right? I mean, I think there hasn't been a lot of great data on this. We're just consistently trying to add more and more information out there for folks to digest.

VICE CHAIR GUNDA: Thank you.

COMMISSIONER MONAHAN: Mr. Vice Chair?

COMMISSIONER MONAHAN: Yeah. Commissioner Monahan, thank you. And I just wanted to say wonderful panel. Again, a lot of good information.

So I think I have a comment and I think I'll kind of come into the question. The whole day we've heard some really good things in terms of recognition of the statewide efforts, including some of the, you know, reforms that the CAISO is doing and how we could continue to, you know, kind of get behind them and then kind of help move forward, whether it's the interconnection reform, whether it's the broader transmission planning reform. So I just like, you

know, love that kind of broad coalition and agreement on how to move forward on those elements.

And I think I also heard some technological solutions and process solutions we could probably put in, including the, you know, basically, DC conversion, the power and the wire reconducting and such. So I think all of that seems to be good, including the transmission zonal approach.

So one thing I think Michael kind of uniquely raised is kind of like a vacuum on coordination between potentially the state agencies and kind of where we might have some cracks. So I wanted to see, Michael, if you could expand on that? Because I've heard this now a few different places, including some oversight hearings on the need for a coordinating entity. Are we kind of -- you know, what are we talking about? Is it that the existing processes are not transparent and then not clear? Are we talking about things falling through the cracks between different processes or not having stakeholders having the opportunity to shape them? Would love to hear what your thinking is there.

MR. COLVIN: I appreciate the question, Vice Chair Gunda. Thank you so much. Two quick responses.

The first one is we had this type of ombudsman role in California to help get a lot of projects built

during the Recovery Act timeframe. It was some special liaisons coming out of the Governor's Office, and it literally was just doing the crosswalk of, hey, wait a second, are you aware that if you miss this approval by three weeks, because you're asking for a whole tour review, it's going to throw off this queue study by six months? Did you know that? I'm not telling you how to vote, I'm not telling you how to view anything, but are you aware that this is the timeline?

And a lot of times folks just didn't know. It was just really, you know, folks fall into their own decision-making, you know, pace and, you know, people get sick and go on vacation and everything else happens and they don't necessarily have the vision of, wait a second, a three week delay is going to all of a sudden turn into six months because of this snowball effect.

Now sometimes there's a really good reason to do a three-week delay. I am not trying to jam anybody. But the part of the coordinating role of understanding that dashboard, of doing that, is just to make certain that everybody has the information so that way the decisions are being made with kind of full information.

And having been on the receiving end of that when working at the PUC, it was very, very helpful to be able to say, oh, yeah, we can prioritize getting this contract out

over this one because we didn't know that there was this timeline attached to it.

I say this again, as much respect as possible, I've seen a huge amount of improvement in the interagency coordination, both anecdotally and visibly with the MOU and everything else. But there are going to be turf wars between the agencies. That just always happens. And so whether it's one of the people who are on the dais today want to raise their hands, if it is, you know, somebody else as a part of the administration as a neutral third party, I don't care. It doesn't really matter to me. But I think it's more about how do we deploy the information and less about who's taking their time to do this one individual aspect.

Not the most satisfying of answers, but I just want to recognize it.

MR. SMELOFF: Michael, your idea of an implementation plan makes a lot of sense. We have 46 projects that are coming out of the Transmission Plan, 24 reliability, 22 policy driven, $9.5 billion. You need to have a dashboard and it needs to go all the way up to the governor. He needs to know what's happening because ultimately he's the accountable one for getting all of this done and implementing SB 100. So an implementation plan with a lot of visibility and sort of a dashboard for high

level policymakers so they understand what's happening and what isn't happening.

MR. COLVIN: And I guess, Ed, the last part of that is that I think it's in the customer/ratepayers best interests. Because one thing that we learned coming out of the ARRA timeframe was the more that we were transparent about that, the more federal dollars flowed to California. And so the more that we can prime ourselves being ready to take advantage of all the production tax credits and all the investment tax credits that are out there for new transmission and not just the generation projects, the better off we're going to be.

I recognize that the recommendation I'm making here is going to require some staff and it's going to require a website and some dashboards. That is a pittance of an investment compared to the ratepayer savings that we would receive. And I think it's the biggest slam dunk BCP that any of you could write.

VICE CHAIR GUNDA: Thank you, Michael, really appreciate that and jumping in, I think that's very consistent with, you know, some of the problem and recognition and some of the irons in the fire, so really appreciate those comments and we'll continue to move forward on that.

So if, Commissioner Mohan, I can ask a quick

follow up to Will, if you're okay with that?

COMMISSIONER MONAHAN: Yeah, but can I build on this dashboard before we leave that concept?

VICE CHAIR GUNDA: Sure.

COMMISSIONER MONAHAN: So, you know, I asked the last panel, are there any examples across the country of like a transparent -- more transparency around, you know, process and applications and where they are and what the whole lips are and the answer was, no, not really. And I'm just wondering, like a dashboard sounds like we have to have a little more transparency, which we have no good models for yet.

MR. COLVIN: We have sort of a model.

COMMISSIONER MONAHAN: And is that sort of consistent or do you guys have -- do you have some suggestions for what could be a good model?

MR. COLVIN: We have a quarterly transmission, I forget what it's called, but a transmission meeting that occurs that's led by the CAISO and with the PUC. And the transmission owners, you know, come up and they report on the project. So you have a quasi dashboard that's occurring already but it's at a lower level. And there's a lot of frustration in those meetings because, you know, the answers are sometimes what will get back to you.

So there needs to be something more than that

that happens just quarterly, but that's sort of a good starting point for getting a dashboard.

COMMISSIONER MONAHAN: So it would be using those meetings, collecting the data from it, and then having it be more publicly accessible through some kind of forum?

MR. COLVIN: Yeah. And Commissioner Monahan, I will put into the docket for this, it's already in a different Energy Commission docket, but I'll make certain it's in this IEPR docket, the full growing the grid report. And we have some examples of both other localities that have this, but also just the types of information and data that we think should be excluded.

My guess is that each of the agencies that are out there have a certain amount of information that if we just layered them on top of each other, not creating anything new, but just put it all at the same place, we would see things that we're not seeing right now. And so it could be something as simple as an Excel spreadsheet that is up on a website. It could be something much more infographic based or anywhere in between.

You know, this is what Tableau was made for. This is not that hard. The data is something that you all have. I think the dashboard is designed, one, for internal or inter-agency coordination, but two, the developer community to be able to see, oh, here's where I am in this

queue and I'm going to be able to make this financing window, or I need to get this done, or I have to bail. It is so important for them to be able to have that level of transparency that it was the single number one theme that we heard in all of those stakeholder interviews was just let us know where we're at and we can manage the risk better. And, again, the more managed the risk is, the cheaper the price is going to be for the customer.

MR. GORMAN: And the only thing I will add in this conversation, because it's not about transparency, it's a less high level, I think, than the conversation we've been having, but I will agree with the panelists that came before us about I wouldn't say there is another region that is necessarily offering a super transparent process.

And one aspect of the DOE program that I am a part of is thinking more seriously about what happens pre-request. Before you enter an interconnection queue, you know, what information would a developer want or need to have in order to make their choices and decisions with more accuracy or precision?

I think the zonal approach is actually one step in the transparent kind of solution. They're telling you, alright, these are the regions that we're going to try to connect a bunch of people and we're going to be proactive about transmission. I haven't seen actually a lot of that

necessarily in other regions.

But I will say there's still a gap, at least from what we're hearing, you know, from developers around, well, what can we expect costs to be particularly in that process? And the cost information is particularly non-transparent. And ultimately, hosting capacity is important, like how many gigawatts, you know, can we install in a certain region? But the developers really are on the hook for the costs.

It's a little bit different across regions. It's a little bit different actually in California than in other regions. But being more transparent with some of that information before you make an interconnection request could be a part of the solution here.

VICE CHAIR GUNDA: I think I'll just comment on one thing and maybe, Will, just kind of have a question because we had strong comments on this. But for the last, you know, six months or so, the agencies have, you know, including CAISO, CPUC, CEC and, you know, GO-Biz like what Rohimah Moly mentioned earlier today about the TED Task Force, we are beginning to bring all of the data streams together. I think the question right now is to how to make it public, which parts can we make public? So there has been questions.

But I just want to, you know, reiterate to you

all that the agencies collectively see this as a really good opportunity, as well, and have solutions already, you know, ramped up to hopefully, you know, kind of bring them complete in the next few months. So just wanted to lay that out for you guys.

But one question, Will, you know, we've kind of talked about today the opportunity with existing infrastructure, you know, transmission through the reconductoring and others, increasing the capacity. And all roads on the discussion point to LBNL, I mean, LBNL is solving that. Could you weigh in on that a little bit on, you know, what the research is and what the opportunity is? I've heard, you know, hundreds of gigawatts of opportunity.

MR. GORMAN: Yeah. So, you know, the challenge of being at a national lab is that I have peers, you know, in the 50s to 100s of people, and so I am actually not the particular researcher that is focused on the reconducting here. That's been being led by my colleague, Amol Phadke, so I cannot give you numbers. But what I can do is connect you and provide information that his team has been actively working on in terms of reconductoring.

That's why I asked the question in the panel because, you know, I was not aware of the numbers, but you are right, that that is something we are working on. It just isn't the team that I'm supporting, but I can follow

up with you.

MR. SMELOFF: Will, the one number that stuck in my mind, I met with Amol and spent some time with him, was that the -- you know, typically HVDC are long lines, like, you know, TransWest Express. But now we're seeing it more happening in Europe on shorter distances. And they were saying that sort of the crossover point is about 130 kilometers, 120 kilometers the DC converter stations become cost effective. So there are more opportunities for HVDC. Yeah, I totally agree with that.

MR. GORMAN: Yeah, I totally agree with that, the opportunities are for sure there. I cannot give the number, though, to the Commissioner, unfortunately.

COMMISSIONER MONAHAN: Commissioner Douglas?

COMMISSIONER DOUGLAS: So I'm just reflecting on taking us back for a moment to the conversation on interagency coordination and what information can and should be made publicly available and when. And I just wanted to share a few perspectives.

I was Chair of the Energy Commission when the REAT (phonetic) and REPEG (phonetic) processes that Michael Colvin mentioned were implemented and took part in a lot of that effort. I think there were some important distinctions between the mobilization, which was very successful to organize state and federal agencies to get a

fairly, in comparison, fairly manageable number and set of renewable energy projects through state and federal processes on a timeline that was relatively parallel. And yes, there were permitting issues that was mainly focused on permitting. There were interconnection issues at a different scale. There were other challenges.

You know, I think just a couple points. One is that the real troubleshooting, you know, the real kind of conversations about, look, your three-week slippage here snowballs into a three-month slippage there, so can you please prioritize, those conversations were not public. They were interagency. They were not put on any kind of dashboard. I don't think there should be an expectation that they would be. I think the quarterly meetings that Ed Smeloff mentioned are a great forum for some of this. You know, it's not my decision. I'm open-minded about whether and what more might need to happen to improve that.

But I just want to be really clear that a lot of times it's market-sensitive information. There could be confidential information. And the agencies need to have that space to be able to prioritize and communicate. That's a little different than what people outside can and should get and when and on what interval.

The other point I want to make just for all of us to reflect on as we think about our processes is that I

truly don't think we should cut and paste the REIT-REPEG process from 2008, '09, '10 into today's environment. I think that the issues that we face today are different in terms of scale, level of complexity, number of players, and more. And it's really a question of what's the process around transmission interconnection and how do we improve it? How do we need to be coordinated around that? What about permitting? What about planning?

I think we have made tremendous progress in how the agencies communicate, plan, and work. I think the GO-Biz TED Task Force effort probably does a lot more than most people will ever get to see and, you know, just because it is that kind of interagency coordination. And I'm the last person who would say more and better isn't required because, you know, we all see the scale of what we're trying to do, and more and better has always been required.

And so, you know, I want to express a lot of openness to ideas for how the processes can be better, but I just really wanted to speak up. Having been in a lot of those early processes, they were great. They were ripe for what we encountered. They were largely very successful and there's a lot we can learn from and leverage from them but it's not a copy-paste. It's what can we learn from them and also what's different? And I think there's a lot of

interest in that here on the dais and in the overall dialogue, so thank you.

COMMISSIONER MONAHAN: Thanks, Commissioner Douglas.

I just want to make sure to see if anybody else on the dais has a comment or question before we turn to public comment. Alright, I don't see any more hands raised. One last second.

Alright, I'll turn it over to Heather for public comment. Thanks, everybody, for participating today. Really appreciate it, well, this panel and all the panels that have come before today. It was really an informative, action-packed day, lots of information to process.

MS. RAITT: Great. Thank you, Commissioner. I echo your thanks to all the panelists and particularly that last panel there.

So we are moving on to public comment. And if you are on Zoom and -- well, we're all on Zoom, but if you are on the Zoom platform, please press that raise hand to let us know that you would like to make comments. And if we are on the phone, you can press star nine.

And so I will go to our -- we have three hands up. And so first is Kate Kelly.

So Kate, I'm going to open up your line? And then if you could state your name and spell it for the

record and your affiliation? And so the line is open. You can go ahead.

MS. KELLY: Good afternoon. Can you hear me? Okay.

MS. RAITT: Yes.

MS. KELLY: Terrific. I'm Kate Kelly, K-A-T-E K-E-L-L-Y, and I'm here on behalf of Defenders of Wildlife.

Thank you to the virtual dais and all the excellent panelists today. This was a great conversation. It was much needed. And I appreciate the thoughtful input from everybody.

The zonal planning really does provide a platform for the transformational change that we need to see moving forward to meet both our transmission goals and all of our energy deployment goals. And so we appreciate the ISOs vision and moving that forward.

Part of that value is and ability within the zonal planning is to be able to take our full toolbox of planning tools and apply them to meet the needs of identifying where transmission should be built, where renewable energy should be built, and how we're going to plug it all in together.

And the CEC's land use screens that have been developed, through the hard work of Erica Brand and her team, our key to that. It’s how they flow into the busbar

mapping, into the IRP and the TPP and moving forward. That allows us to both identify, plan, and invest in lease conflict zones for renewable energy development and investment, which will in turn streamline development by reducing delays that come from siting issues as well as litigation costs. And then also reduce costs to rate payers through having less mitigation requirements as well as certainty in the process.

So we think that it's really an important step and a key component as part of that planning process. And it also will provide the top-to-bottom policy alignment that's been talked about today so that we're not just meeting our energy policy needs, but also meeting our state and Western states' equally aggressive environmental goals of protecting our environment while balancing renewable energy development, including meeting the goals of 30 by 30.

So thank you for the work today. Thank you for the forward thinking, particularly with the zonal planning. And we look forward to continuing to participate in the process.

MR. WENDER: Heather, you are on mute. You may want to double check that.

MS. RAITT: Oh, my gosh. Sorry. Okay. Thank you.

Next is Claire Broom. If you want to go ahead, your line should be open.

MS. BROOME: Good afternoon. Can you hear me?

MS. RAITT: Yes.

MS. BROOME: Okay. Claire Broom, C-L-A-I-R-E B-R-O-O-M-E, representing 350 Bay Area. Thank you very much for an interesting and thought-provoking day. And it absolutely pulled out the severe constraints on siting and permitting as well as timeline for new transmission.

And I wanted to hold up what Michael Colvin said about the importance of making cost effective decisions as you consider how to move forward, specifically incorporating the cost of transmission into the estimates of the cost for new resources is particularly critical. As the CPUC has shown, the cost of transmission is a substantial and rapidly accelerating part of California electricity rates.

San Diego now has a transmission access charge of $0.06 per kilowatt hour, basically more than the cost of the new generation. And the studies that have been cited in support of the regional transmission organization generally don't incorporate the cost of transmission required to get those cheap Wyoming wind resources to California.

So I guess my comment is to strongly urge the

Energy Commission, as you go into the new IEPR, to look at costs in a way that incorporates both the generation and transmission cost of resources very specifically to have a level playing field so that medium-scale energy resources on the distribution grid are considered when you look at least cost options for development. I think we will obviously need to optimize both, but in the current environment, RESOLVE does not have a differentiation between in front of the meter distribution grid resources and those resources requiring transmission. So it biases against selecting distribution grid resources.

Similarly, the TAC is charged to all investor-owned utility customers, meaning that there is no cost advantage for a distribution grid resource. I know we're going to get to the distribution grid in the next workshop, but I urge you as you go into the new IEPR to do a real level playing field which gives an accurate assessment of distribution grid resources where there will be fewer difficulties in permitting, et cetera.

Thank you very much.

MS. RAITT: Next -- well, first, I'll just say again, if you would like to make comments, please press that raise hand button on Zoom. And if you're on the phone and would like to make comments, press star nine.

So next is Mariko. And please spell your name

and tell us your affiliation, if any, and your line is open.

MS. GERONIMO AYDIN: Hello, my name is Mariko Geronimo Aydin. It's M-A-R-I-K-O, with Lumen Energy Strategy. Thank you for this workshop and to all of the speakers.

We just completed the Energy Storage Procurement Study for the CPUC. I'll first say that my views here are my own and not necessarily those of anyone at the CPUC. Our report shows some of the incredible achievements you all have made in scaling up storage connected to the transmission system, and I want to first acknowledge that.

In my comment, I want to underscore the importance of the WDAT interconnection process and urge you to make sure it's not too much of an afterthought. I especially appreciate the utilities presentations earlier today and CAISO's comments that touch on that and the difficulties they see. It is in an awkward jurisdictional space.

In the storage study, we observed that needs are growing for clean energy resources interconnected closer to the customer and closer to communities on the grid. We know, for example, that no amount of transmission interconnected resources are going to help when a resilience failure happens on the distribution grid.

At the same time, we find evidence of barriers to scalable resource development on the distribution system. And here I'm talking about resources placed in front of the utility's customer meter and behind-the-pool transmission facility, and barriers in those resources being able to value stack services that they are uniquely positioned to provide both to the distribution system downstream and the transmission system upstream.

So there's a space here that could be opened up for innovative resource solutions here, and I urge you to consider that. Thank you.

MS. RAITT: The rest, all of you, if you'd like to make a comment, press the raise hand button on Zoom, or press star nine if you're on the phone. Give it another second here. Alright, I'm not seeing any more comments.

But before I turn it back to Commissioner, let me just remind everybody that we also welcome and encourage written comments. And I know we heard about a bunch of things that we wanted to hear, get more information on the record, and so written comments are due on May 23rd. And all the information for doing that is in the notice.

So with that, I think we're done with public comment, and I will turn it over to Commissioner Monahan. Thank you.

COMMISSIONER MONAHAN: Great. Well, thanks,

Heather. Thanks to everybody who's participated today, and I really want to thank my colleagues on the dais in particular. It's been a long day, and I just really appreciate that everybody has stuck with it and look forward actually to working with all of you on the next step, which is preparing the report.

But I just want to highlight, you know, folks that were on the dais throughout the day. We had, from CAISO, President Mainzer, and Neil Millar from the PUC. I still see Chair Reynolds and Commissioner Douglas. We also had the other Commissioner Reynolds on the phone for part of the day. Of course, my IEPR team member, Vice Chair Gunda, who has been a rock and whose brain I love to pick over and over again, as well as Commissioner McAllister, who is also going to be hopefully weighing in in a BK appropriate way in all of this, and Commissioner Gallardo, who was here for a bit in the morning.

So we heard a lot of good ideas. I want to emphasize a point that Vice Chair Gunda made, which is just so much support for what CAISO is already doing, the zonal approach, I think Ed Smeloff called it transformational, and just that there's been a lot of great work, and so we're starting from a strong building point.

We heard a lot of specific ideas about more we can do around transparencies, ways to whittle down the

queue, including encouraging customers to pay more attention to the zones where there's capacity, use performance-based incentives, grid enhancing technologies, which I love that term GET, and a little bit at the very end of the day around a Western RTO.

So as Heather said, we really just encourage folks to give written comments. This is one day for a big weighty topic, but we want to get more information into the hopper ideas that we can consider.

And next week we're going to be turning to the distribution side, which I actually feel is more in my sweet spot in terms of we're facing a lot of issues on building out charging infrastructure in order to meet the state goals. Lots of opportunity there in terms of doing it in a way that's grid enhancing, I would say, grid friendly, and just some opportunity for improving our processes as well.

So if any other member of the dais wants to make a comment, you're welcome to. Just raise your hand.

Vice Chair Gunda?

VICE CHAIR GUNDA: I want to just, quickly, just wanted to say thanks to all the team and just to you for envisioning this. I think this was excellent. I think great day. We're just getting started. I thought we had a third segment today and going into the evening. This is

great. So thank you for organizing this. I just wanted to give you kudos and just admire your leadership on this, bringing everybody together. Thank you.

COMMISSIONER MONAHAN: Thank you. I was joking a little bit about having another panel, I think. I think we're exhausted.

I see Chair Reynolds has her hand up.

PRESIDENT REYNOLDS: Thank you. Yeah, I also just wanted to thank all the panelists, the members of the public who listened in, and thank you, Commissioner Monahan, for leading this. This has been a fantastic dialogue. There were so many things to think about, good ideas. I look forward to the next steps in the process because I think this really framed a lot of issues and brought a lot of interesting ideas into the, into this process.

So thank you very much for setting it up in the way that you did, Commissioner Monahan. And again, thanks to all the panelists.

COMMISSIONER MONAHAN: Great. Thank you, Chair.

And Neil?

MR. MILLAR: Oh, thank you. Yes. Actually, Elliot Mainzer asked me to apologize on his behalf that he couldn't stay for the rest of the day. He did have a pressing family obligation yet to attend to.

He did ask me to pass along how much he appreciated the day and the fantastic dialogue. He was able to listen to most of it, so he really appreciated that.

And also both he and I are really looking forward to continuing to work with all of you and our industry partners on working on these critical issues and achieving the state's clean energy goals. So I just wanted to pass that along, so thank you very much.

COMMISSIONER MONAHAN: Great. Thanks so much, Neil.

Well, that wraps it up. I hope folks can join next Tuesday when we'll turn to the distribution grid and I'm sure it'll be an equally interesting day. Alright, thanks, everybody. Thanks, all my fellow members of the dais, for joining.

(The workshop adjourned at 4:40 p.m.)

CERTIFICATE OF REPORTER

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

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 17th day of July, 2023.

MARTHA L. NELSON, CERT**367

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July 17, 2023