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STATE of CALIFORNIA

CALIFORNIA ENERGY COMMISSION

In the matter of:	)	Docket No. 21-IEPR-06
	)	
2021 Integrated Energy Policy Report (2021 IEPR)	)	Re: Industrial Decarbonization

IEPR COMMISSIONER WORKSHOP TO
ACCELERATE INDUSTRIAL DECARBONIATION

REMOTE ACCESS ONLY

Tuesday, August 3, 2021

Session 2 of 2: Industrial Outlook

Reported by:
P. Petty, CER

APPEARANCES

Workshop Leadership:

J. Andrew McAllister, CEC Commissioner
Patricia Monahan, CEC Commissioner

CEC Staff:

Heather Raitt, Program Manager of the Integrated Energy Policy Report, Meeting Moderator
Dorothy Murimi, Public Advisor's Office

Panel 1:

David Stout, CEC, Industrial, Agricultural, and Water Unit,
Moderator
Jeff Malin, Applied Medical
Scott Starr, California Steel Industries
Steve Coppinger, CalPortland
Jennifer Haley, Kern Oil
Brian Seitz, Frito Lay North America

Panel 2:

Kelly Kissock, Ph.D., University of California, Davis, Moderator
Lance Hastings, California Manufacturers & Technology Association
Nora Sheriff, California Large Energy Consumers Association
Wayne Nastri, South Coast Air Quality Management District
Catherine Reheis-Boyd, Western States Petroleum Association

Public Comment:

Hugo Mejia, SoCalGas

I N D E X

P R O C E E D I N G S

August 3, 2021 2:01 o'clock p.m.

MS. RAITT: Good afternoon, everybody. Welcome to today's 2021 IEPR Commissioner Workshop, Industrial Outlook. I'm Heather Raitt, the Program Manager for the Integrated Energy Policy Report, or the IEPR.

This workshop is being held remotely, consistent with Executive Order N-08-21, to continue to help California respond to, recover from, and mitigate the impacts of the Covid-19 Pandemic. The public can participate in the workshop consistent with the direction in the executive order.

This is the afternoon and final session of this workshop. To follow along with today's discussions, the workshop schedule, and presentations are available on the Energy Commission's website. All IEPR workshops are recorded and the recording will be linked to the CEC's website shortly following the workshop and a written transcript will be available in about a month.

Attendees have the opportunity to participate today by asking questions or uploading questions submitted through the Zoom Q&A feature, or you may make comments during the public comment period at the end of the afternoon, or you may submit written comments and instructions for doing so are on the meeting notice.

Written comments are due August 17th.

And, with that, I will turn it over to Commissioner Andrew McAllister.

Thank you.

COMMISSIONER MCALLISTER: Thank you, Heather.

A pleasure to be with all of you again this afternoon. Thanks again for putting together a great day. Really -- a very exceptional morning, a couple of great panels setting the stage for what we're going to talk about this afternoon.

I won't repeat most of what I said this morning, but just want to express a really keen sense of optimism here about being able to do something important in the industrial sector. And we have to because we have some very urgent, increasingly urgent clean energy transition goals, and certainly we're all living through the drought and climate change on the front lines here in California. And we really have a lot of work to do.

And the industrial sector is one area where I think we have -- there is more headroom because I think we haven't quite gotten an organized direction in the state to address decarbonization in that sector and there's a ton of opportunity. So we have a lot of leaders in the room this afternoon, a couple of panels, the first one moderated by David Stout, from the Energy Commission, and

then the second one by Dr. Kelly Kissock, who is a relatively recent arrival to California and has deep unique experience in industrial optimization and is at U.C. Davis now. So we're lucky to have him in the state.

With that, I think there are number of themes I think that will carry over from this morning. Certainly the thermal piece of the puzzle and how to transition that away from fossil gas in terms of and/or trying sequestration options for that remainder. And I think we have historically thought about that piece of it as some years out, but increasingly I think we have urgency to really get ahead of that, and the hydrogen and the CCUS discussions are moving forward, beginning to move forward, which is really good. So hopefully we can dig into that this afternoon as well.

With that, I think I will invite my colleague Commissioner Patty Monahan to make any comments for the afternoon.

Thanks for being here again.

COMMISSIONER MONAHAN: Thanks, Commissioner McAllister.

I too am looking forward to the afternoon. As anybody was there in the morning, you heard me ask, well, what do we do about oil and gas, and what do we about refining emissions, which are almost half of all the GHG

emissions from the industrial sector, and now we have Cathy Reheis-Boyd and others to help us answer that question. So just really curious to hear how -- the advice that our panelists give us and looking forward to the discussion.

COMMISSIONER MCALLISTER: Great, Heather. Back to you and to David for the first panel.

MS. RAITT: Super. Yes.

So thank you for our first panel on what are industries currently doing and planning to do to decarbonize. And, as we mentioned, David Stout is the moderator, and he supervises the Industrial, Agricultural, and Water Unit in the Research and Development Division.

And thank you, David, for your leadership in helping put this workshop together. Go ahead.

MR. STOUT: Thank you, Heather. My pleasure.

So, as Heather said, I supervise the Industrial, Ag, and Water Unit at the CEC. My team funds and manages research to increase energy efficiency and decarbonize those three sectors, including advanced research and development projects and larger technology demonstration deployment projects.

The focus of this afternoon's first panel is to discuss what the industrial sector is doing and planning to do to decarbonize. I'm joined by five panelists that

represent a range of industrial subsectors. As we talk about the technologies today, I would also like the panelists to touch upon policies that have enabled decarbonization so far and what is needed to further enable decarbonization.

I will introduce each panelists in turn and invite them to take their -- to turn on their camera and introduce who they are and share what their organization's doing.

Reminder to the audience: Plus put questions in the Q&A box. If there are questions directed towards a specific panelists, please include their name.

I'd like to now invite Jeff Malin, Manager of Government Affairs at Applied Medical, to turn on his camera, give his intro and give his presentation.

MR. MALIN: Thank you, David.

Hopefully you guys can hear me okay. My name is Jeff Malin. I'm in the Department of Government Affairs side of the business at Applied Medical. And before we get started, I want to do a couple of acknowledgements and thank the Energy Commission staff, Jennifer and Ms. Jones, for inviting us to participate in the meetings and also suggesting that we come and speak to the workshop. And to the Commissioners this morning, I was part of the first -- part of the workshop and, you know, the commissioners

asked a lot of great questions and I think really kind of help lead in some of the discussions we're going to get into this afternoon, so I'm very thankful about for that.

A little bit of background. And so I work at Applied Medical. I served for six years within the Governor's Office of Economic Development in the State of California, so I've had my fair share of a lot of the issues that we're going to get to.

And one of the interesting things about the company I work for now is just our business, our core values, and our principles. The next slide, please.

So the company I work with now is called Applied Medical. We're a new generation medical device company. And we are a little bit different. We're privately owned. We can sort of do what we want. And so we have elected to have a really high level of core values and standards as a company, with respect to economic accountability, involvement, sustainability, and social responsibility.

Our company has been around for about 34 yes. And what makes us unique is that we're vertically integrated. We compete with the largest medical device manufacturers in the world and we are the global leader in one of our products, the Voyant cart specifically. And the way we were able to achieve that is through this vertical integration. We literally keep everything close

to the chest. We don't have a lot of long supply lines. And, as a result of, we're able to control a lot of things ourselves and so because of that we rely heavily on achieving efficiencies in order to compete in the global marketplace. Next slide, please.

So what you see on screen in the next slide is some of our products. I just want you to kind of get a flavor for who we are and what we do. You know, as a vertically-integrated company we spend a ton of money on research and development, and we make everything right here in California. And we ship all these products out globally throughout the 75 countries around the world.

And so our need to have the ability to achieve and access clean, efficient, flexible, and resilient power is paramount. And in the next slide, I will show you what I mean by that. Next slide, please.

So on this slide you will see kind of why that's the case for us. We have basically three large clusters of industrial space throughout Orange County. One of those clusters is in Irvine where we have about 300,000 square feet; another 300,000 square feet or so are in Lake Forest, where we're building our first microgrid; and then in Rancho Santa Margarita is where we have got the balance where we're building a couple other microgrids.

And our microgrids are connecting smart battery

energy storage systems. You know, I'm using ARPA-E-funded iron-flow redux batteries that are the best in class. We're connecting photovoltaics, we're connecting micro turbines, you know, for natural gas consumption. And central to all that is, and one of the previous presenters, was to optimize energy management. So we are buying the best in class microgrid controllers which are connected to AI, which are connected to, you know, data in the cloud to help predict and help us program our power consumption needs over time, especially when you factor in things like the weather and what not. Next slide, please.

Here is where I want to show you where we have got some of our challenges. So this is a blow-up of a lot of our properties there in Rancho Santa Margarita. And our first policy issue is the process of interconnection. So you will notice that there is a large building on the left side of the screen called R100. When we purchased that property, it had fuel cell generators on it that had -- and photovoltaics, which had way more power being produced than we actually needed.

Then across the street we've got a lot of other buildings that could use that power. Now one of our issues is that because the interconnection process is not really clear, and I'm sparing a lot of technical details --

MR. STOUT: Jeff, you muted yourself.

MR. MALIN: Oh, sorry. Sorry. So thank you for catching this.

At the end of the day we had a hard time interconnecting. And still to this day we aren't able to send power across the street. This is something that, you know, schools can do, hospitals can do, a lot of other operations out in the world can do, and we've had a problem with that because, in our view, the interconnection process is just simply not clear. And that's one of the things we'd love the Commissioners to take a look at and moving forward is: How can I make it clearer so that I can have an A to Z guide that says if you follow all the steps, the utility can't come in and just discretionarily say, 'I think it's unsafe. If you were to send in a design like that, we're just not going to approve it,' which is actually what happened to us. Next slide, please.

The next slide is I borrowed this straight off of EPA, and I wanted to credit the presenters that spoke this morning from EPA, specifically Elizabeth Dutrow and Virginia Lew and Bob Gemmer. You know one of the interesting things when you look at CHP, and this comes straight off of the EPA's website, and this is again their illustration, their bullet points, is if you notice at the

center of this illustration there is an electrical boiler there at an efficiency of 80 percent. And so they get to this overall efficiency in the seventies, but there is, at the end of the last bullet, this note about the ability to achieve a higher efficiency.

And so it was great to hear that energy efficiency is at the top of the mind for everyone, but what was left out of it, which was really interesting to me, is what we are doing. So, you know, we're using absorption chillers, using lithium bromide absorbent chillers to increase the efficiency up to the 90 percent. And that is the waste heat recapture. I think that's missing from a lot of the CHP designs that are out there.

And that leads us to our second public policy issue which we wanted to bring to the Commissioners' attention. We are currently engaged in the CPUC's microgrid tariff rulemaking proceeding. And our read is that the CPUC missed an opportunity in their tract to decision by excluding natural gas from being eligible as one of the sources in the tariff in their tract to decision. Now they are going to take up the interconnection process in their next RMWG workshop, and we'll see how that plays out. But natural gas is something that our microgrids just can -- we want to be able -- our microgrids aren't feasible without natural

gas. Natural gas, as I mentioned as something earlier in this presentation, is something that's clean. You know, they're on their way to getting to carbon neutral within -- by 2035. It's efficient, it's flexible, it's affordable, and, more importantly, it's resilient. And it's available to us at 24/7. So power shutoff events, we're fine, we're good to go.

And if I could get a few more seconds in, one of our last issues is storage. Melissa mentioned earlier in the beginning of our workshop that is Southern California is restricted. So at the end of the day, we become kind of a quasi balancing agent for the system because we've got a lot of alerts saying, hey, you can use more gas, use less gas, and that's really frustrating to our operational folks who are obviously just trying to stay within a certain lane for as much as natural gas that we do consume. So storage is another issue that we're hopeful to get the Commissioners' views on.

And, look, seven minutes is not a lot of time to get all of our points out. I'd like to invite Commissioner McAllister and Commissioner Monahan to our facilities, come take a look. We're not that far away from California Steel either. You can may be visit them both. But come take a look at what we've got and maybe from there you could even dive into some of the more

technical details. Thanks for taking the time to speak with you this afternoon. I'm looking forward to the Q&A.

MR. STOUT: Thank you, Jeff, for sharing some of the efficiency efforts you're pursuing and some of the challenges that you face.

I will now turn it over to Scott Starr, who is the Executive Vice President of Operations at California Steel Industries.

Go ahead, Scott, if you will turn on your camera and introduce yourself and share your presentation.

MR. STARR: Yeah. Thank you, David. I appreciate the opportunity and invite to speak to the group today.

As David said, my name is Scott Starr. I'm the Executive Vice President of Operations for California Steel. Next slide, please.

Just a background on us. We're a steel rolling facility here in Fontana, California. We're on the former site of the Kaiser Steel, which started here in the forties. Our owners took over the company in the eighties. We have more than two million tons of rolling capacity for the western U.S. And we make flat-rolled steels and electric resistance welded pipe for oil and gas transmission.

We sit on 430 acres in Fontana. We spent over a

billion dollars in capital investments and we're a good employer. And you can see from our stats we're very proud that we've never had a layoff in our history. Next slide, please.

Just to give you a background of the money we have put into the facility over the years, these are some of the more major investments, but we have spent over a billion dollars since 1992. And really specific to this group here, you see the investments for number 4 and number 5, hot strip metal reheat furnaces. These are our large reheat furnaces for reheating slabs and a major source of our greenhouse gas emissions here at CSI. Next slide, please.

Just to give you a little background on our business model, we import slabs, so our raw product is slabs. We buy most from international sources, some domestic, although the domestic sources are not readily available. We take those slabs and we convert them into hot rolled, pickled and oiled, galvanized coil, cold coils. And you can see we take those slabs, reheat them in one of our two furnaces, and do subsequent rolling processes. Some of that hot roll is formed into a resistance welded pipe. Like I said, it's for oil and gas transmission. Next slide, please.

This is our internal processed here. And you

can see our starting product, the slabs, just a general description of them. But the boxes in green are really our source of emissions. We have two reheat furnaces that take those slabs and reheat them so that we can roll them into thinner gage strip. From there, it's either sold as-is or we can process it via our continuous pickling line, which is an acid solution to clean up the surface. We take it from there and then cold reduce it farther.

Most of our product goes into construction end uses, like decking, studs, joists, or service centers that take it and sell to OEMs for further fabrication. And then our other two processes, the galvanizing lines where we take that strip and put a zinc coating on it for corrosion protection or anneal it for ductility and better formability.

Like I said, the items in green are our sources of greenhouse gas emissions here at CSI. These are benchmark, under the greenhouse -- the Cap and Trade legislation. And important to point, the reheat furnace, we're the only one in California that does this. So when we talk about steel, obviously it's a commodity. Other people throughout the country and the world do it, but we're the only ones in California that have this business to do this at this time. And our process results in about ten percent of the overall greenhouse gas emissions for

the final product. Next slide, please.

Just to give you a perspective, and as the previous gentleman said, we'd love to have you come and take a look at our facility because we think it's something to see and impress in person. But we take those slabs and we put them in one or two of our furnaces. Those slabs are on average 25 tons of steel, nine inches thick, 74 inches wide, 432 inches long. We process between 240 and 400 a day, up to 2300 degrees Fahrenheit, so it takes a lot of energy. And natural gas is the accepted way for one doing that. We have no evidence or no understanding that anybody else does the electrification for reheating slabs like this. And in fact we have done a third-party study that I will talk about later, but it's a high intensity heating process that takes a lot of energy to do. Next slide, please.

This is just our performance over time and this is largely efficiency gains mostly by those two -- those two reheat furnaces. They are environmentally sound, the best in class at the time of installation. You will see over the years, we have reduced our CO2 per ton by about 38 percent. Next slide.

The concerns for us, of course, as we go into electricity, we are also a major electrical user. So when it comes to electricity, the high rates in California

that, you know, we're subject to, it does play a part and it does affect our bottom line. And the ones -- the items in yellow are the other western states where, you know, as evidenced by a recent move, some steel producers have moved to other states in pursuit of those lower costs. Next slide, please.

Just as a representation, if we did our process as-is anywhere else, we would save at least $15 million, just on the electricity cost alone. Next slide, please.

So getting to what we want to do to reduce the greenhouse gas emissions, we had the EPA study that was released in 2012, made 11 recommendations. We have employed nine of those already, through temperature and process control. We have recuperative burners, we have regenerator burners, and waste heat recovery. The two that we have not implemented yet: Hot charging of slabs. We don't make the steel there, so that alleviates that. And we continue to look at oxy fuel and hydrogen as a substitute for natural gas. Next slide, please.

Just as I mentioned, we did a third-party study to look at electrification of our reheat furnaces as part of work conducted with CARB. Basically what we found is other than -- that it doesn't exist and is not necessarily technologically feasible at this time. The full cost would increase our production costs by 600 percent and the

full electrification with current generation would actually increase the greenhouse gas emissions as a result of that process. So we have looked at how we can do that and it is not possible at this time. Next slide, please.

So what we continue to look at, we can, like I said, continue to look at the burner technology that exists. We are making improvements and we will continue to make improvements by adding SCRs and more efficient burners to all of our sources. And we continue to do studies with industrial gas suppliers and others and SoCalGas looking at how we can get more natural gas from renewable sources, hydrogen and oxy fuels, to fulfill our process. And the other we're looking at, we move a lot of steel around here with locomotives and other major equipment, that we are currently looking at how we can make that electrified.

So for us natural gas is very important. It's our only way of completing our process and it's the only one in California. We're certainly subject to a little bit different rules as opposed to other people in the country and the world when it comes to how we manufacture steel.

Once again, I thank you for the time to go over all this with you. And we certainly -- any time you want to come down and take a look at our facilities, we're

happy to show them off. Thanks very much for your time.

MR. STOUT: Thank you, Scott, for that quick, whirlwind overview. For those that can't visit CSI's facility, which I imagine will be a lot of the attendees, they do have a great video on their website, so I have to plug that video.

I will now turn it over to Steve Coppinger, Vice President of Corporate Services at CalPortland.

Go ahead and turn on your video, Steve, and introduce yourself and give your presentation. Thank you.

MR. COPPINGER: Great. Thank you, David, and Commissioners, staff. Thank you for the opportunity to speak to you today.

As Commissioner McAllister said, I'm excited as well that you're including some of the industrial companies into the program this week and going forward. Next slide, please.

A little bit of background about CalPortland. We were founded in 1891, so we've been in business quite a long time, and we were founded in California. And we're a large manufacturer of construction materials that are used in bridges, roads, buildings. Those products include cement, concrete, aggregates, asphalts. And most of our facilities are in the western U.S. and Canada. We do have three cement plants, and I will touch on those a little

bit today as they are probably the most energy-intensive units that we operate within the company.

We've also been honored to receive EPA's ENERGY STAR Program of the Year Award for the past 17 straight years for energy management. So we take sustainability and energy management very seriously. Next slide, please.

So concrete is very ubiquitous. It is used -- it's the most widely used material in the world, next to water. And if you look around at construction projects, you will notice that almost every project has some form of concrete being used in the project, so it's an important part of our infrastructure and our daily lives.

And within the concrete products, cement is one of the materials that's a key component that gives concrete its strength and hardness. And the process that's required to make cement is pretty energy intensive. We use quite a bit of fuel and heating materials to 2700 degrees Fahrenheit in a rotary kiln. A lot of electricity is used in the grinding and crushing and conveying part of the process.

But something that's unique to our process, cement process is that 60 percent of the CO2 emissions are a result of the chemical reaction that occurs between limestone and heat that does drive off CO2 emissions. So 60 percent of our CO2 emissions are chemically based as

opposed to being induced by fuel or electricity.

But another unique feature about the concrete product is that during its lifecycle it does absorb CO2. So after concrete is installed and it's in your sidewalk or the freeways, it is absorbing CO2 out of the atmosphere in a process called carbonization. Next slide, please.

I wanted to give you a little background about what CalPortland has done with decarbonization. We have taken a holistic view of decarbonizing and reducing our emissions. First and foremost, we have been very actively involved with ENERGY STAR and energy management, looking at ways to improve our process to reduce our fuel intensity. But we've also spent a lot of time looking at mobile fleet emissions and reducing those emissions through converting some of our diesel truck fleets into CNG and ultimately using RNG, renewable natural gas, which has a very low carbon intensity, in some cases even a negative carbon intensity. And we have looked at other technologies, like hybrid trucks. And so we're continuing to explore new avenues to improve our efficiency.

We also have one of our cement plants in Southern California that has 24 megawatts behind-the-meter wind turbines. So when the wind is blowing, we're making our cement products with the wind, with zero emission electricity. We're working right now with the utilities

to try to get that wind to be available in case our plant is down or reduced in load to get that out on the grid.

We also have sustainable products that we have come out with. One of the lines is Advancement which is where we use partly limestone cements which are cements that reduce the amount of material in our products that require the pyroprocess in fueling, so we blend a little bit of limestone with our cement products to reduce greenhouse gases by 10 percent. Likewise, we also use other alternative materials like Pozzolan both in cement and concrete to, again, reduce greenhouse gas emissions.

We are currently running a feasibility study with an engineering company to identify technologies that would be the most appropriate to use in our cement process for carbon capture and utilization. And I think everybody knows one of the big challenges is if you're able to separate the carbon, which is a challenge, -- or the CO2, I should say, figuring out what you're going to do with the CO2 is the next big hurdle for us.

We also investigate other technologies in looking at our emissions and scrubbing the emissions to reduce CO2 and other emissions, and combine heat and power. We have investigated things as diverse as solar concentration, that we have looked into that a little bit to see if that would help us with doing some heating of

our process gases.

And we're very interested, we have used a lot of alternative fuels and other raw materials to, again, reduce the amount of the CO2 footprint in our process. Unfortunately, we currently only get credit for the biogenetic fuel portion. A lot of the world does get full credit for using alternative fuels, and that's something that maybe could help us with advancing the usage of more of these fuels.

We also are very aggressive in our recycling. For example, concrete, when concrete comes back from a job that's not been used or the customer sends it back because they have enough already, we do repurpose and recycle that concrete material to a reclaimer, where we can reutilize the materials again and separate them and reutilize them. Next slide, please.

So, more broadly, I wanted to mention what cement industry is doing. In the United States, right now there is the development of the Roadmap to Net Zero by 2050 that's being initiated by the Portland Cement Association and its members. This is something that will be announced this fall, so they are going to be very active in not only -- have not only created a roadmap but they're going to look at ways that we're going to get there as soon as we can.

And within the California cement industry, they have also developed and accepted a carbon neutrality plan for 2035 that's sponsored through the California Nevada Cement Association. And I will talk a little bit about what that means for California cement plants.

And the industry as a whole has been very active in the ENERGY STAR Program. You heard me mention that before. But as far as energy management and energy efficiency, this is a great program, to allow a lot of the large energy consumers in the country get together and share best practices. But we also participate in the benchmarking they provide where plants can be certified as high performers in energy efficiency.

And the industry has also taken advantage of some of the Department of Energy grants for carbon capture and energy efficiency. Several pilot projects are underway right now to look at ways to capture carbon and utilize it.

And, again, as we have done, the industry as a whole has worked with alternative fuels and raw materials to reduce CO2. And, again, Portland limestone cements are a part of -- a part of our whole product mix.

You can see from the graph on the right-hand side, this is an older graph but it does show a significant shift over the years in improving energy

efficiency in the industry. Next slide, please.

So I mentioned in California there is a program now, the Carbon Neutrality Plan that's been accepted by the cement companies in the state. They have identified seven levers of trying to meet those goals. And I'm not going to go into all of these, but if you look at the right-hand column, some of those challenges and some of the challenges can be identified in key barriers that will -- that we need to work together as the State moves on its own carbon reduction plans. And that's why I'm, again, really excited to be a part of this panel here today.

One of the things I mentioned for Portland limestone cement, which this is something that we can -- as soon as CalTrans accepts the performance of these types of cements, you're going to have a higher amount of limestone and less of the materials that generate CO2. And immediately we would have a 10-percent savings on greenhouse gas emissions. And we're hoping that CalTrans accepts -- accepts this some time in October of this year. We're looking forward to that.

But that's all I have for now. And I, again, appreciate the opportunity to talk to you today.

MR. STOUT: Thank you, Steve. Really appreciate you not just sharing not just what CalPortland is doing but sharing what the cement industry as a whole is doing

more broadly.

I will now turn it over to Jennifer Haley, President and CEO at Kern Oil.

So go ahead and introduce yourself and give your presentation, Jennifer. Thank you.

MS. HALEY: Thanks. So Peter Drucker once said the only thing we know about the future is that it will be different. And for us at Kern Oil, as a small refinery and a renewable fuel producer, we often semi seriously joke that the only thing constant in our industry is change. And so our business in California looked very different 85 years ago, when we first opened our doors. And We are extremely proud of how we have evolved as a company and how we're continuing today to embrace the opportunities inherent in the transition to clean energy, you know, and frankly to do our part.

We are very unique. Despite our small size we are actually the only refinery producing gasoline and diesel between the major complexes in the Bay and L.A. And so we're a critical supplier for the San Joaquin Valley and for the heavy diesel demand from agriculture in the valley and also transportation demand from the I-5 corridor. Okay, next slide, please.

California was actually -- California. Kern, who is in California, was actually the second refinery in

the country to get a renewable diesel fuel registration from the EPA back in 2009 for coprocessing biomass, a tallow, or animal fat, through one of our hydro treaters. And so the carbon intensity of that renewable diesel that we produce is around 30, as compared to traditional diesel, which is over a hundred grams per megajoule. And so today our diesel that goes out the gates contains up to five percent of both our renewable diesel, which we produce on site, and biodiesel that we bring in to blend.

And so Melinda Palmer, on our team, analogizes it to hiding vegetables in your children's food. And most customers don't actually read the fine print at the pump, and so they might not be aware that there is renewable material in the diesel that they're purchasing. And so we have talked about how the five-percent labeling limit is really an opportunity, particularly on the renewable diesel side. So that is a fuel that is chemically indistinguishable from petroleum diesel, but much cleaner, and so there is real potential for a drop-in replacement fuel, which would be able to utilize existing vehicles and infrastructure. And so in the immediate, one of the thoughts that we had is some coordination between the federal and the state level on how we bump up that limit, you know, even going from five to ten percent can make an incredible difference. Next slide.

So Kern's size can be both a challenge and also an advantage. And I'd like to think that we have actually used our size to our advantage. We can be incredibly nimble. We've got a flat management structure and the ability to prove out new technology and new renewable fuels in a commercial environment but on a much smaller, more feasible scale. And for comparison purposes, most of the other refineries in the state are ten times our size. And I could do an entire presentation on this, I would love to give examples, but please connect with me offline in the interests of time.

I think when we talk about opportunities going forward, we really need to focus on widespread adoption, on meeting people where they are, and recognizing the so-called sticky emissions, right, heavy industrial, heavy-duty diesel, and jet. I see the opportunity for providing a glide path to carbon neutrality that also prioritizes energy reliability, affordability, and building on economic prosperity.

We as a state and around the world have a tremendous amount of infrastructure. You know, fueling station, combustion engine vehicles, and the supporting industries around that infrastructure, refineries included. And so I think the key is figuring how do we drive down emissions without throwing away that

investment. If we're able to do that, that can also make our advancements more palatable and exportable to developing countries, allowing California to have a GHG reduction well beyond our approximately two percent of global GHG emissions, and so making the business case for the reduction.

You know numerous studies have recognized that we cannot get rid of oil and gas entirely because we're going to continue to have ongoing demand for the products from those materials. One wonderful study was the "Getting To Neutral Report" that came out from Lawrence Livermore National Lab. Petroleum products are intertwined in our economy. So how do we do the best that we can, recognizing that carbon neutral does not mean no oil and we cannot just abandon that industry.

I argue that we do that by utilizing the Low Carbon Fuel Standard continuing to drive down the carbon intensity of liquid fuels, but also to support innovation around neutral or even negative carbon intensity renewable fuels that can be used by that existing infrastructure. Most importantly, I think our regulators and our policymakers have to give space for innovation and be careful not to prematurely decide what will get us there to the detriment of innovation that might prove critical for us actually to achieve our goals.

At Kern, we are going down a dual path of, you know, expanding our existing renewable fuels and also aggressively pursuing next generation renewable fuels. And by next generation, we're really focused on waste to fuel, looking at ag waste, municipal solid waste, or woody waste, especially when you look at the push for better forest management and the likelihood of additional material. And so that's really an opportunity to hit two birds with one stone: Finding a home for these waste materials instead of burning landfill or land application, and to generate these negative carbon intensity wet renewable fuels that can be utilized in existing vehicles, fueling stations, and be made in our refineries. Next slide.

From a high-level perspective, I think it's important that we focus on the big picture. We have to be careful not to address issues in a vacuum without considering unintended consequences. We risk creating more serious problems than the ones we try and solve. I think having a large group of stakeholders is a piece of it, but we also need people with skin in the game. It's way too easy to advocate for policy when you don't have to actually live with the consequences. Regional might be the appropriate scale to have that line of sight and also have the process be small enough to stay manageable and

making sure that people have a personal connection to the outcome. B3K, the Better Bakersfield & Boundless Kern, I think is one example of that kind of work. Look it up. It's great.

Regulatory uncertainty is a tremendous obstacle to renewable fuel investment. It can take years to get from concept to execution and, frankly, we don't know if the incentives or even the regulatory programs are still going to be there.

The conflicting policy that we get across agencies and from the Governor and the State versus the federal is also really challenging. I think streamlining this process and having people have a clear understanding of what they need to do to get a project off the ground would help.

I also think the reluctance to fund or incentivize oil and gas investments when it comes to emission reduction and also renewable projects is extremely problematic. You know we have the same issues when it comes to other industries around regulatory uncertainty and not knowing whether we can make these investments and support them long term, and so having that support, having that investment or incentive can help us, you know, green light some of these projects.

You know, I think it's incredibly important for

us to innovate and part of innovating is providing room for failure. And so how do we create an environment in California that supports people kind of pushing what we can do. So thank you so much for the time, and I appreciate the opportunity.

MR. STOUT: Thank you, Jennifer, for your summary of what you're doing to decarbonize and some of the challenges that your industry subsector faces.

I will now turn it over to our last panelist, Brian Seitz, from Frito Lay. He is the Sustainability Principal Engineer and Energy Manager. He does not have a slide deck, but I will go ahead and turn it over to Brian.

MR. SEITZ: Thank you, David.

Yes, thank you, everybody, for allowing me to participate in this event. I was a last-minute add, so I didn't have time to get a slide deck through our executive -- or, I'm sorry -- through our external communications team for approval, so my apologies; but I can speak a lot to who we are, what we're doing as an organization.

So, as David said, I am the Principal Sustainability Engineer and Energy Manager from Frito Lay North America, so as such I oversee all of our Scope 1 and Scope 2 Greenhouse Gas Emission Programs, all of the reduction efforts across our manufacturing entities, so that's about 38 manufacturing plants in total across North

America, 32 of which are in the continental United States, three of which are actually in the state of California. So we do have a large manufacturing plant up in Modesto, a very large plant in Bakersfield, and a pretty decent-sized facility as well in Rancho Cucamonga. So excited to talk about what we do.

You all know who we are. We're Frito Lay. I'd like to think and suspect that many of you are our customers in many ways. If not in the snake world perhaps in one of our sister companies, through our beverages, Quaker, etc., all umbrellaed under PepsiCo.

This is great timing for us. Most of our efforts, I have just recently got through building out our waterfalls to hit our newly-announced greenhouse gas reduction goals. They're very lofty, very, you know, cutting edge in many ways from an industrial standpoint and a food and beverage standpoint. We are after a 75-percent reduction in our Scope 1 and Scope 2 greenhouse gas emissions by 2030. And then full net neutral operation and supply chain by 2040, so about 10 years ahead of the Paris Accord.

Part of that, we did make the RE100 commitment, so we have gone completely renewable on Scope 2 greenhouse gas emissions by way of red purchase. We did that last year. Given the volatility within that market, we are now

rapidly starting to diversify that and employ -- or deploy BPA agreements with varying different entities to help offset the Scope 2 and the amount of recs. that we have to purchase from an annualized basis.

Additional to that, we still have very robust programs around electrical efficiency. That's going to be critical to one of our pillars over on the thermal side. So a lot of our work to do or to go is going to be over on our Scope 1 side on all of our natural gas consumption at our facilities.

We have bucketed ours into three levers, if you want to call them that. The first being ops efficiency, so those are all of your traditional thermal efficiency measures. Digitization, we are embarking upon our journey on full digitization of sustainability within our manufacturing facilities with batch forwards, submetering, etc. Heat recovery -- excuse me -- heat recovery, national oven strategies. The gentleman from California Steel talked about they tried to electrify their furnaces. I can't even begin to fathom the load that that was going to require. We tried to do the same thing for our toasting ovens, and we needed six megawatts per oven of additional load just to try to achieve the same thermal output. So that was not going to be feasible for us. So we're trying to make those as efficient as possible.

And then the second lever is going to be more around renewable fuels, so we know that we have to start to convert a lot of our steam generation operations off of natural gas and over to biomass boilers. So we're deploying, partnering with third-party consultants to actually do a landscape survey of not just California but the entire country on where is it going to make sense, where is an available fuel source, and where, you know, would we potentially be in competition for that fuel source, so it we can start to lay out what our biomass portfolio is going to look like. We do have two biomass plants already, so we're looking to replicate those at several other facilities.

Obviously things like solar, we have a partnership with the CEC right now at our Rancho Cucamonga facility where we're in the engineering design portion of it, but we will be standing up a large microgrid at our Cucamonga facility towards the end of next year.

Hydrogen, you know that's the big one, right. You know we know that I don't have a pipeline that's coming up to my plant full of hydrogen, but we know we have to start to look to fuel switch over to a hydrogen and/or other, you know, renewable natural gas type fuel source. So that's spurred -- look at technology, reactor technology that we can take our wastewater streams from

the manufacturing plant before it hits our onsite wastewater treatment facility and then generate hydrogen through a reactor process to then power either fuel cells and/or boilers.

And then electrification. You know that's a huge one for us. That's obviously involving a lot of our fleet electrification. We've got our Modesto plant, we have electrified their fleet. They will be getting their first delivery of Tesla tractors hopefully, you know, this year -- by the end of this year. So there has been a long road there. As well as the rest of our fleet, so our fleet team is going after complete electrification. The challenge they have there is obviously availability of those assets, given the size of our fleet.

And then we're looking to electrify any of our current thermal loads. There's very few we can do right now inside the facility, but we know that we we're excited about what we may be able to hold for future, and there is a research. We definitely need to beef up that technology right now. Electrification of some of those thermal processes just isn't mature enough for us to start to, you know, take it off from a reliability standpoint.

I know we have talked a lot about CHP. We actually have two CHP plants within our portfolio. They are actually my two largest greenhouse gas contributors to

my fleet, so I have to have solutions for them. We do recover the heat, we do generate steam off of them. But due to all the natural gas that we consume to generate the electricity load for the facilities, we know we have to solve it. So we're, you know, looking at deploying robust solutions. We're building out what those roadmaps are going to be.

The key thing that we realize as we start to roll out our waterfall and what our reduction is going to look like to get to the 2030, one, was we know we have a gap, so that's where transformative technologies and things like that are going to start to come into play, and that's okay to have a gap at this standpoint, but our gap is relatively small. But the other thing is, is there was not one tactic that we could say was like the homerun, that this was going to give us step function changes when we laid it all out. It's actually going to be a bunch of -- in terms of baseball -- a bunch of small ball. You know, singles and doubles. You know we're going to have to single them to death to get there, but it adds complexity to the plan and the challenge ahead of us, but we do know that we can get there.

So that's really what I had. You know, from a journey standpoint that's what we're looking at doing in the areas that we're looking to lean in, you know these

areas apply for both our snack manufacturing as well as our beverage operations. We do have several of those in the state of California as well.

Thank you. Thank you for your time.

MR. STOUT: Thank you, Brian. Thanks for joining late to our panel, even though we didn't give you enough time to prepare a proper presentation and get it through approval.

I will now turn it over to your dias, Commissioner McAllister, to have his Q&A session.

COMMISSIONER MCALLISTER: Great. Thank you, David. I really appreciate that.

And thank you to all the panelists. You complement each other very well. I think we heard some themes, primary among them I would say, you know, there is no silver bullet. We're really talking about silver buckshot and single, lots of singles. And so I think that's a fair strategy for winning the game, so. So hopefully it works for us too.

I guess I would love to visit, first of all, I can't speak for all of the Commissioners but I suspect that several of us would love to do a little tour of your facilities in Southern California and kind of do maybe do a big circle and get as many of you as possible in there, but certainly Applied Medical and California Steel, I

think those would be very, very interesting to visit.

And I know from personal experience how enlightening it is to actually set foot in a plant and look at the actual machines and the actual processes and talk to the actual floor manager that's got it, that's in charging of production to really get a feel for challenges and the realities that the industries face. And so I think that would be super helpful.

And then on the flipside, you know the CFO or the decisionmaker that really kind of has to keep an overview of the business and make decisions based on the global reality and so I think that definite piece of it is equally if not more important. So there is a lot of pieces to this puzzle.

I guess I wanted to just talk about --

(Tones.)

COMMISSIONER MCALLISTER: -- ask you -- sorry -- sort of help us prioritize. Okay, so here we are with the State. You know happily we're looking at having some resources to approach the industrial sector. We know more or less where the emissions are, we know some of the challenges.

If you were putting together a program to really get the most bang for buck in terms of helping our industrial sectors decarbonize, I'm thinking there are

roughly three buckets, so you could certainly correct me or give your understanding on this, but you know we have existing technologies that may be fairly capital intensive to sort of jump tracks to new processes. You know maybe that's electrification. You know those are relatively stiff investments that have to have a long timeframe. And so is there a possibility for this space to help match, make for capital, or pitch in its own capital, so utilizing existing technologies, developing new approaches that just help you optimize. You know, maybe that's data approaches, monitoring causes, improvements, things like that. Or number three is sort of the policy and regulatory side. And I think we have heard particularly on number three that you see some deficiencies in the policy side really that could help facilitate your decisions that you would already like -- like to take.

So I guess, you know, in terms of your biggest bang for the buck for a program, that if we're going to put some resources somewhere, is that technology investment, is it technical assistance of some sort, is it more of a facilitative conversation that we should be putting resources into?

MR. MALIN: I'll take this up first. You know we're a private industrial operating company. We don't need incentives. We are doing this ourselves. We're not

looking for funding, we're not looking for help. What we're looking for is a clear process. And our issue is the interconnection process as -- it hasn't helped us achieve the efficiency we want to achieve. And I would venture to guess we're not the only ones trying to do what we're trying to do. I'm just -- you know, I'm happy to be here as a guest of the Commission, but I think the biggest bang for your buck is trying to figure out you've got this conflict of interest here, as a company I want to use less electrical power, right. So here I'm asking SoCal Edison, hey, help me to use less of what you're trying to sell me, right. So you've got this kind of inherent conflict of interest. What's in it -- what's in it for them, right. So why would they and why would they make it easier, why would they make it faster.

And so from a practical standpoint we run into that problem on the ground, when we're trying to get an interconnection across the street. Oh, you can do this, you can do that. No, that's not true.

You know, there's this thing called the filed rate doctrine which says, hey, no matter what the utility says, there is a rate that's been filed, so even if they tell you, you can do something that you really can't, it's on you as the customer to really know that. And I think that's a challenge where you need a level of

sophistication, right, to understand that.

COMMISSIONER MCALLISTER: Well, thanks for that. I guess I would point out there are some precedence for this. In the early-ish days of the rooftop solar kind of transformation that California had seen, the globe had seen really, the Governor's Office, this predates the current administration, but I think it's instructive, the Governor's Office convened stakeholders around the rooftop solar, obviously it's a completely different sector or a largely different sector, but to really come up with best practices for local governments in terms of permitting and, you know, how building departments could get the huge -- you know, get that job done really by facilitating inclusion of rooftop solar. I wonder if there is not another sort of facilitated conversation that might be analogous to that where we could get people in the room to really try to hash some of this stuff out, acknowledging that the interconnection issues really do sit more with the PUC than at the Energy Commission.

MR. MALIN: It is and, you know, through the SB 1339 which was the bill that current -- is trying to commercialize microgrids, there is a statute in there that says the Energy Commission has to consult with the PUC --

COMMISSIONER MCALLISTER: Yeah.

MR. MALIN: -- on that. You know I'll share

with you, because I come from GO-Biz, I remember what you're talking about, I'm aware that there is, I think, maybe one of the trailer bills is looking at installing an energy policy unit within the Governor's Economic Development group to think about how energy policy actually influences the state's economy. That might be a good conduit for that discussion, you know, and here we are in the workshop, but, yeah, maybe we could take that one offline.

COMMISSIONER MCALLISTER: This is really a matter of industrial policy, as we were discussing this morning --

MR. MALIN: Yeah. That -- right. That unit would be looking at industry policy, right. It would be looking at those policies --

COMMISSIONER MCALLISTER: Yeah.

MR. MALIN: -- to figure out where we can --

COMMISSIONER MCALLISTER: I want to --

MS. HALEY: I was -- I was going to say, if you don't mind, Commissioner McAllister, I will jump in and --

COMMISSIONER MCALLISTER: Yes, please. Please do.

MS. HALEY: -- try to kind of pull it back a little bit. And I think some of -- I'll say -- the whining you're hearing from some of the panelists,

including me, is because there is this confusion around what we're allowed to do, how we're allowed to do it. And you think you're okay with one agency and then all of a sudden you're sideways with another agency. And so I think it's critical whatever you decide to do.

And, Jeff, I think we do need incentives and we do need funding, but you have to have the regulatory support after, right. It's not enough just to provide the incentive or funding, you have to take a step back and look at the system as a whole and think what can we do to make this easier. What can we do to accomplish these goals that we're telling stakeholders we want you to accomplish, but we're going to put increasingly high hurdles in order for you to get there. And so I do think that that's almost like one leg of the stool that's really important. And I know we were talking about that even from permitting a renewable project, right.

And someone in Kern County made this comment to me of, you know, we only want the people who really want a renewable project in California, right. And it's because it's so difficult to figure out what you have to do and who you have to clear it, that you're necessarily pushing out a lot of interested parties and investors because they just can't figure it out. And so I do think having more of a streamlined process and maybe even it's a legislative

roadmap of, okay, here are the things that we need to do, so it's clear this is the agency that ultimately has authority even if there's some overlap and there has to be some consulting, I think having that regulatory clarity would be extremely helpful when it comes to pushing forward projects or innovation.

COMMISSIONER MCALLISTER: Thanks, Jennifer. And, to be clear, I do not hear what you're saying as whining at all. I don't think any of us do, really. I mean we have to acknowledge, you know, part of the reason we haven't made a lot of decarb progress sort of at least intentionally as a state, I mean I congratulate all of you on what you've done of your own accord to optimized your processes, and there is a decarbonization benefit from that, you know, in a big way, but in terms of coordinating sort of a more consistent response, I think that's exactly why we're here, so. And if one of the solutions to this is convening an interagency, you know, with stakeholders kind of conversation, I think that's -- that's a tremendous outcome, actually, because we -- if it could help define exactly what that would look like, I think that right there is a big step forward. And then not that that's all we want to do, but I think that in and of itself is good to do.

MS. HALEY: Well, and I guess I'll just chime in

to answer the other part of your question. I mean we have these jokes about silver buckshot and hitting singles, and I think that's absolutely right. You know one of the issues that we run into is with some agencies we -- the response when we ask how funding was, 'Well, we like to fund start-ups.' Do you know what the failure rate is of start-ups? Like, and that's great, like we want to encourage kind of up-and-comers, but some of this technology is not sexy and exciting and new. It's these little incremental benefits that are going to have a huge impact across the system not only in California but outside our borders. And so I do think it's important to have not only short-term, long-term benefits, but also recognize that there is value in those incremental benefits, particularly when you can apply them across industries, right. And so trying to balance that wanting something bright and shiny for this election cycle sometimes versus, you know, what's ultimately going to get us to our goal.

COMMISSIONER MCALLISTER: Yeah. Thanks for that. And I couldn't agree more.

I think -- so, Steve, or Scott and Brian, did you have any ideas you want to pitch in?

MR. SEITZ: Commissioner, I'm a huge fan of the FPIP program that you guys have -- by way of that or have,

in essence, unlocked our ability to go and start to stand up the microgrid at our Cucamonga facility. So while we have huge hurdles and we know those are going to take absolutely investments from the organization, we're still, you know, connecting those two together. So programs, as Jennifer was mentioning, that provide incentives, grant and funding things like that help us to close the gap from a payback standpoint that help it -- help us to get our program stood up a lot sooner than what we would be able to, right.

So I think that if you are looking from a program standpoint, something in lines of the FPIP or equivalents, you know, across other industries or sectors or industrial sectors, I think those pay huge benefits.

And then even as much as just a program that doesn't even take a lot of funding, right, just resources potentially within your state, looked at the forum consortiums of like low carbon pilot programs. I participate with the DOE in their low carbon pilot program. So you might look at something like that, to have consortiums of. And the industrial sector, be able to regularly meet up and brainstorm and talk about what each is doing, and things like that.

MR. COPPINGER: I agree with all these comments. And I think if you can envision some of these solutions

that we've talked about today, whether it's carbon capture or utilization, energy efficiency, all these different avenues, each one of those is going to take a huge permitting process. Any time we change our equipment or our process or alter our emissions in any way, even if it's to improve energy efficiency, for example, we have to go through the hurdles of, you know, possibly new source review or some sort of permitting process to get through. And that could take a long time. And that's sometimes going to hold us up from what we'd like to accomplish.

COMMISSIONER MCALLISTER: Well, that's a great point. How important is federal and state coordination in that regard in terms of the air issues? I mean we obviously have a lot of authority primarily in the ARB in the state, but, yeah, a new source review, etc.

MR. COPPINGER: Well, it's critical. You know in our business we deal with the national Title 5 type of permitting, but we have to deal with local authorities in each one of our facilities to make that happen. And, again, we have the case where we have this Pozzolan material which can reduce the CO2 when you blend it with concrete or cement. When you have a mining site, we have been permitting for two years now, you know as soon as we can get this material authorized for mining, we can save energy -- or some greenhouse gas emissions right away, we

still have another year or two, so that uncertainty I think makes it a challenge overall.

COMMISSIONER MCALLISTER: Thanks for that. I feel -- so Commissioner Monahan had to drop off, and I feel a little bit remiss if I don't channel her a little bit. And I think on -- you know three of you mentioned sort of how to displace fossil with bio resources, with hydrogen, and then liquid fuels, you know the bio resources as well with unit fleet, etc. I wonder if there is anything -- I'm not going to ask nearly as articulate a question as Commissioner Monahan would, but I wonder if there -- you know, we could have an analogous, just a very brief discussion, because we do have some time limitations, but just what we could do there, and certainly LCFS is kind of front and center on the fuel side, on the liquid fuel side. I wonder -- and we have these cross -- you know, electricity fuel substitution -- we have the cross, different-kept sectors, but what could potentially facilitate a conversation look like for those resources?

MS. HALEY: So I'll jump in quickly and say, you know, I think we have to recognize that not everything we try is going to work, right, but there is value in giving space for the innovation. So I think funding kind of those smaller kind of pilot projects or even smaller scale

commercial to see what technology or what feedstock works, I think that would be helpful. And that provides a little bit of that -- you know, that payback and that certainty where you don't feel like you're betting the farm on something that might not work out. And at the end of the day, I think a lot of the companies that are trying these things, it's for the benefit of the entire state, right. Even if it doesn't work, it's like, okay, we've tried that, let's try something else.

COMMISSIONER MCALLISTER: Actually I see that Commissioner Monahan is back. Thank you, Jennifer.

Hopefully I didn't butcher your thoughts or misrepresent, Commissioner Monahan. I'm trying to ask some questions more about the biofuels and looking at something more over to the transportation sector, but if you'd like to ask a question, please go ahead. We're ready when you are --

COMMISSIONER MONAHAN: You know, I missed a lot. I had to run off for another sensitive issues, so I missed, sadly missed, but I hope to be here for the entire next hour, so.

COMMISSIONER MCALLISTER: Great. Great, perfect. So let's move quickly to the Q&A, if we have any, from the Zoom audience.

MR. STOUT: We just have one question in the

chat. Feel free while I'm reading it, if there are any additional questions, to type it in the Q&A.

So this one comes from the Bay Area Community Land Trust: The production of biofuels can require the use of extremely hazardous materials that pose a risk to the surrounding community. How are you managing these risks?

And I think, Jennifer, this was directed towards you.

MS. HALEY: All right. So figure out how to get myself off mute, right. No, I think that this is an excellent question. And before I dive into the details, I will say I think all of us, whether you're a biofuel facility, a refinery, a producer, a chip manufacturer, right we operate at the grace of our community. And if we're not a good community operator and we don't care -- take care of our employees and our community, we're not going to be able to operate anymore. And so I do think this is an important perspective.

I think on the specific question, from a feedstock perspective, right, we're looking at using nonhazardous materials, you know, tallow and animal fat, which is closer to food and even woody waste and things like that. And then from a processing perspective, I think there are robust regulatory requirements. And for

us as a facility, we make safety and environmental compliance an absolute priority for every single one of our employees. And then we have a robust environmental health and safety department that's also helping kind of facilitate those conversations.

But at the end of the day, you know we are operating in the communities that we live, they're our homes, and so, absolutely, safety and environmental -- you know, that has to be the number one thing that we do. And I think it's a balance. And from a Kern perspective, I also think it's providing the opportunity to innovate around carbon reduction, NOX reduction, particulate matters, looking at ways we can continue to innovate in order to be a more efficient operator and also be an even better community participant.

COMMISSIONER MCALLISTER: Great. So is that it, David, for questions?

MR. STOUT: Yes, that's it for questions for now.

COMMISSIONER MCALLISTER: Okay. So --

MR. STOUT: Back to Heather.

COMMISSIONER MCALLISTER: Let me just -- I just want to ask Scott: Scott, did you have anything to add here? I know -- I'm not sure if you've been crowded out or if you're just happy with everybody else's answers.

MR. STARR: I think everybody has answered the questions more than adequately, but not to lose anything, incremental gains are okay. We don't have to shoot for the moon every time. But we know there's things we can do right now to help us along and make it better for everybody. And realizing that this doesn't stop at the border. So this is -- this is something we all want to do, but we have to realize the environment we're working in.

COMMISSIONER MCALLISTER: That's okay. Well, I'm super excited to continue this conversation. And I guess it sounds like, just the take-away from my perspective, you know trying to sort of anticipate getting some resources to dedicate to this sector, but also sort of hearing from this panel that really it needs to be a broader conversation beyond just resources but really sort of understanding in a more integral way the challenges and needs of the various participants in this sector, in our economy, and kind of go from there, really, and then hopefully distill out some channels for actual resources and project funds. But that is really a great start, so thanks a lot of all you for helping get us oriented and pushing this conversation forward. And it's really huge. Thank you.

MR. STOUT: Thank you.

All right. Well, thanks to our panel.

Back to Heather. I think -- and I see Dr. Kissock is on, so thank you for being with us here as well.

I will pass it off to Heather for introducing the next panel.

* MS. RAITT: Great. This is Heather. Our next panel is on what policies or programs are needed to accelerate decarbonization. And Dr. Kissock is moderating and he is the Facility Director at the Energy Efficiency Institute and Director of Mechanical and Aerospace Engineering at the University of California at Davis.

So go ahead, Dr. Kissock. Thank you.

DR. KISSOCK: Thank you, Heather.

As Heather said, I'm Kelly Kissock. She gave you what I do. The Energy and Efficiency Institute has been advancing energy efficiency in California for 15 years through private-public partnerships, research and development. Like Ahmad and Asfaw from this morning's sessions, I've had the pleasure of working closely with industry on energy efficiency and economic competitiveness for 25 years as a director of the DOE-sponsored Industrial Assessment Center.

And I'd like to thank the Commissioners for inviting me to be a part of this important panel, and our

panelists for their participation.

Our panel will be discussing what policies or programs are needed to help industries accelerate decarbonization. And our first speaker is Lance Hastings. Lance is President and CEO of the California Manufacturing and Technology Association. He's a long-time advocate of job creation in California's high-paying manufacturing sector. Prior to joining CMPA, he served as a Vice President of National Affairs for Miller Coors, internationally for SABMiller, and as a Chief Consultant in the California State Legislature.

Lance, it's your show.

MR. HASTINGS: Thank you very much, Dr. Kissock.

And thank you all at the Commission for bringing together this forum today and listening to the conversation from this morning through the last panel.

It's becoming more apparent and evident and hopefully optimistic from where we sit that there is in fact a holistic approach that's being utilized to really tackle, I think, the largest the problem of era, and that is going to be how we manage our carbon future.

We now are hitting some of the mid strides, the goals and objectives, it sounds like we're ahead of 2020, but we've got a long, long way to go. And I appreciate the various perspectives from this morning through today.

So I'm hoping what I'm going to be able to do in the next few minutes is kind of set the stage from a policy standpoint from an industry sector, which mine is manufacturing, and talk about how we can get there and what it's going to take. But it is going to take a partnership for sure.

But it's difficult when often we are referred to as just polluters, and that's the first word that comes out of people's mouths, and we are not that. We are manufacturers that actually utilizes processes to turn either raw materials or other goods into the products that businesses and consumers desire. And, therefore, as a byproduct of that we are able to create wealth. And when I say wealth, I don't mean the pejorative sense that gets bandied about in media, but I mean real wealth, growth of GDP, and contributions to the economy. But manufacturing is at the tip of the spear of the economy, because without us we would be regulated to a service economy, which is not sustainable in any community, let alone the diversity and size and scope and scale of California.

So I just want to level set that, that manufacturing is an essential part of the state's economy, the regional economy, and our national economy.

And what you did hear in the last panel, we had a couple of members of ours very well articulate, we all

want to be part of the solution. We are at this table, we're on this panel, we've been on countless others, to talk about how we can get there. Because come 2035, as getting to 2030, to 2040, it's going to be difficult. And it's not going to be a matter of the Legislature putting more penalties on our sector to get there, it's going to have to be done in a partnership, as I said just a minute ago.

And I was a little bit discouraged on the first panel where there was, you know, some discussion about the potential waste within the energy space at businesses, and I will use my example of manufacturing. I kind of disagree with that and I challenge because energy is such an important and expensive component to the manufacturing processes that it is probably the most closely watched input of all, even beyond labor. And there really is no incentive to have any waste whatsoever on any of our inputs, particularly the energy space, whether it be electricity, natural gas, or others. So I just kind of pushback a little bit on that.

I did want to comment that I had a wonderful conversation with Commissioner Douglas a couple of months ago now about the successes of the FPIP and as a model that we may be able to generate some interest in what we kind of jokingly refer to as a working title MPIP, that on

the manufacturing side it seems like there are quite a few opportunities for us to look into some specific programs that can help specific companies be more efficient and get toward the target and with a little bit of incentive.

And I think you have heard the cliché before that sometimes in the carrot and stick debate, make the carrot as big as possible, as if it were a stick, and that's the kind of approach I think that's going to helps us really advance the ball and I hope to continue those conversations with not only Commissioner Douglas but the other Commissioners as well.

And one item that I have been raising since I've been in this role now two and a half years is that it seems like we're in a binary debate. It's either the Legislature and the regulating community or it's the environmental interests and the business community, which is a very binary approach. And what I think has been a missing component to the broader discussion with really academia and having the science and the research be incentivized to identify ways for us to get there, and whatever that there is of course is open to interpretation. But it seems to be lacking and we have kind of regulated ourselves to a purely policy decision rather than one with a roadmap on how we can get there.

Now admittedly when the initial objectives were

set several years ago, it seemed really far enough, 2030, 2045, that's way down the road. But it's not. It is quickly going to be among us. Yet every legislator that was in office at the time that they were passed will not be in office, barring a constitutional change that some were able to run to office again due to term limits. So we have the originating legislative body and the existing legislative body that may not see eye to eye. And our challenges in the manufacturing sector is we have to work within that arena and that environment, and it's proving to be more and more challenging as every year goes by. So I want to make sure that we remain focused on really the objective and ways that we can get there.

And I will just kind of wrap up my comments here to talk about the end of the tunnel. It's clearly within view for all of us, but it's a matter of -- and this is very cliché -- is it the light at the end of the tunnel or is it a train heading our way. And right now I think it's hard for us to tell, but we can at least see down the road.

And I think between the efficiencies that you heard about earlier today by some of the manufacturers in the group and the challenges for those next increments are going to be quite expensive, let's really have that discussion, this discussion, and these discussions so that

we can go to the regulating and legislative bodies and really come up with a solution that works for all of us. Because, after all, we're in the same boat, as it were, we're in the same air, but we all have an incentive to make it as clean as possible.

So with that I will wrap up and look forward to any questions that come later. And certainly the expertise of the panels that follow me are far greater than I am. So thank you very much, Dr. Kissock.

DR. KISSOCK: Thank you, Lance, and thank you for sharing both the motivation that I think we need and the level set and mapping out cooperation and how to get it there.

Our next panelist is Nora Sheriff. She is a shareholder in Buchalter's San Francisco office and a member of the firm's -- hold on just a second -- and a member of the firm's Energy and Natural Resource Practice Group. She serves as Counsel for the California Large Energy Consumers Association and she focuses on electric and natural gas regulatory and administrative litigation, legislative efforts, and end-use contractual transactions.

Nora.

MS. SHERIFF: Thank you, Dr. Kissock.

And thank you, Commissioner McAllister and Monahan, and all of the Energy Commission staff for

setting up this workshop and inviting me to speak on behalf of CLECA.

I would also like to thank Steve Coppinger for CalPortland and Scott Starr for California Steel, they are two important CLECA members that were on the prior panel. I think it's a wonderful, wonderful thing that we have industry speaking at this workshop and engaged this early in this process for the potential industrial decarbonization program, so I really appreciate that. Next slide, please.

So a little bit about CLECA. They have been around since the mid nineteen eighties. I have represented them for about the last 10 years or so. And they're an advocacy group for large, high-load factor, high-voltage industrial customers for whom the cost of electricity is a significant factor in the cost of producing their product or service. And when I say a significant factor, I mean more than a third of the cost, to upwards of 70 percent of the cost of production.

They're in the steel, cement, industrial gas, beverage, pipeline transportation, cold storage, mining, and the food package industries. The aggregate electrical demand is over 540 megawatts, the aggregate annual consumption averages about 3,000 gigawatts, so they use a lot of power. Most of the CLECA members are energy-

intensive trade exposed, which means that California as a state wants to keep these industries here in California operating their facilities because we want to avoid emissions leakage from having those facilities located elsewhere. We're not going to stop using cement, we're not going to stop drinking beer, we're not going to stop using steel. We're going to continue to need these products and services.

Some of the CLECA members are bundled, meaning they take service from the investor utilities. Some have direct access. Some take service from community trade aggregators. All of the members, however, are laser focused on their electricity consumption, on their energy consumption. So all of them participate in demand response and all of them invest in energy efficiency both here in California and nationally and internationally. They know a lot about this field. Next slide, please.

So I have two key points, and this is the first key point that I'd like to make. I think that the decarbonization goal should guide the awards from an industrial decarbonization program and from that perspective, from that key point, I think you should recognize that the cost of a decarbonization effort, of the decarbonization project is a significant barrier to industrial decarbonization. And CLECA recommends that you

consider matched funding percentage levels of at least 50 percent to as high as 75 percent.

Just some of the examples of the cost and recognizing that a lot of the low-hanging energy efficiency fruit has already been plucked by these energy-intensive industries, you have a cost of $10 million or more to put in a boiler stack carbon dioxide recovery unit. Carbon capture and storage can cost from 10 million to over 25 million per site. A new efficient boiler can be about $5 million per site. And efficient air compressors, the cost for those could range from 500,000 to over a million dollars per site.

A key point that Scott Starr made for California Steel was these industrial facilities in California are already facing an energy premium because the cost of electricity here in California is so much higher from the cost of electricity in neighboring states, that that cost really is a key factor.

Also wanted to mention waste heat recovery; bottom recycle CHP, which I personally really believe should be considered energy efficiency, but it's not, so it's not just the cost of that waste heat recovery capital. There is also a departing load charge that gets layered onto a waste heat recovery, combined heat and power facility that's behind the meter, and that departing

load charge gets layered on top of that as an additional cost and that can really kill the economics of a combined heat and power waste recovery project, so I think there is a potential for policies going at cross purposes here between the decarbonization and then the departing load charge.

So when you're looking at the proposals, we'd also like to suggest the lens of focusing on the biggest carbon-reduction bang for the buck. And on that point, don't set any restrictions that would limit applications or awards based on either the customer size or the project size. California has -- as one of the prior panelists put it, you know, we like to fund start-ups has been sort of the mindset here. There is a small is beautiful mindset. So looking perhaps at projects that are under 500 kW or under a megawatt or if it's a five-megawatt project you would only fund the first megawatt with an incentive, we don't think you should do that with this potential industrial decarbonization program. That I think would be a mistake. So focus on the decarbonization goal, focus on the biggest bang for the buck, and don't restrict needlessly based on size.

And the next slide, please.

So, finally, have a clear, concise, and set process. The guidelines, the parameters for review

shouldn't change, particularly after applications have been submitted or a solicitation has begun. Avoid lengthy and unduly complex applications. The time line for review should be set in advance, should be known by all the participants. It should be reasonable, not too long to go from an application or bidding into a solicitation and finding out whether or not you have made.

And we really do like the FPIP model, the Food Production and Investment Program, where you have that streamline track with the drop-in known technologies. If we could get projects and then perhaps the more indepth tract for newer technologies, newer projects, newer costs.

So, finally, for all projects I think regardless of track, the process should again be clear, should be timely, and it should not change.

One point I would like to flag that was raised on a prior panel, when you're having industries, and if everybody's in the same industry you might have some antitrust concerns about sharing information, particularly when you're so energy intensive and it's a big component of your cost structure, I just wanted to flag a concern around the confidentiality of energy usage and how you have to be really careful if you're looking at setting up cohorts to sort of benchmark what's the appropriate, you know, level of efficiency everybody should be achieving.

Make sure you set up those cohorts thoughtfully and don't have just everybody from one industry in a cohort. I will -- I just wanted to flag that.

And thank you so much again. This is a really exciting workshop and we're thrilled with this potential program. So thank you. Thank you, Dr. Kissock.

DR. KISSOCK: Well, thank you, Nora. And thank you for helping us stay mindful of how trade exposed industry is and then offering some positive solutions for going forward.

Our next speaker is Wayne Nastri. He is the Executive Officer of the South Coast Air Quality Management District. Previously he served for eight years as EPA's Regional Administrator for the Southwest Region. And, just a second, and where he worked with public industry and government on pollution prevention efforts.

So, Wayne, I don't think you have slides, but go ahead and take it away.

MR. NASTRI: Thanks, Dr. Kissock. And, yes, you're correct, we don't have slides.

And, to be honest, I think I was somewhat surprised when we at South Coast were asked to participate in the panel. And then after listening to the panelists, I think that I'm very glad that we're here today and I want to especially appreciate, send my appreciation to the

Commissioners and CEC staff for inviting us.

I think when we look at decarbonization, you know, we heard other panelists, that we're all in this together, that we all sort of breathe the same air, and that there are challenges from different regulatory agencies with different authorities. And, as each of the presenters were speaking, I thought, oh, yeah, I know they. We regulate them. They have permits with us.

And I can really appreciate the myriad challenges that they face as they go through that permitting process. And then I think that as we look toward the future, it's really important that we also look at what's right in front of our very nose. And while we talk about accelerating decarbonization and people are talking about 2040, 2035, the fact of the matter is we actually have standards that we have to attain by 2023, by 2031, by 2037. And if we don't attain those air quality standards, we as an area face large sanctions.

And you're probably saying, well, how large. You know if we're not in attainment for the ozone standards, we can lose anywhere from four to six billion dollars a year. That's a billion dollars a year in DOT funding. And the importance of the Clean Air Act is that it does require that we take a look at all of these things. And I sort of say this because as we try to

invest and plan for the future, we've got to make sure that there is a smooth transition to that future. And, you know, we heard a lot of people talk about reliability, dependability, cost-effectiveness. You know, from our perspective reliability is key. And let me give you an example of why reliability is a key.

When we just had one power outage on one circuit and the backup generators kicked in, we had estimated that the total NOX contribution for that one day exceeded all of the NOX contributions from all of the refineries combined. Now is that a lot? Well, let me put it in this context. Right now the State of California has an obligation to reduce NOX by 108 times per day by 2023. And I can tell you we're nowhere near that. And when we look at the power outage events that can contribute over 38 tons of NOX a day.

Then the other aspect that you have to look at are where are those impacts occurring. Nearly 60 percent of the disadvantaged communities in California are within the South Coast AQMD, and it's those communities that have suffered the disproportionate impacts of air quality that continue to suffer. And so I think when one of the comments was made that, hey, you know, we've got to have the ability to try and to fail, and having been at the federal government, having been at private industry, I'll

tell you this if we fail it is costly. It's costing people's lives. And if we're not meeting the standard, we know, for instance, that PM emissions cause premature deaths. We have over 4,000 premature deaths here in the South Coast Basin every year.

So looking at the reliability as we transition to a decarbonized future is critical. You know we've heard people talk about hydrogen, we've heard people talk about renewable natural gas. They're great. We're supportive of those. The challenge that we see is to deploy them at scale so that we get the results soon enough. And what is that going to take? We know we can't regulate our way into compliance, into attainment, and so what do we have to do? We've got to provide incentives.

And so it's so important for organizations like the CEC and the South Coast AQMD to work with the federal government to really get funding, whether it's through the next relief plan, whether it's through an infrastructure package, but we've got to be able to invest in the deployment at scale of technologies that are going to give us the immediate benefit both in terms of air pollution as well as decarbonization; because we fully agree that when you look at the climate impacts, we've got to get to zero. And when we get to zero emissions we will, in large part, have addressed the air quality challenges that we face.

And I think the other aspects is, you know, we always talk about how transportation is over 80 percent of our NOX on the heavy-duty side. But on the industrialization side, the two have to go hand in hand, and so whether we're looking at the creation of cleaner fuels through biofuels and greater deployment, we've got to think about how those two can be combined in the transportation sector so that we get the benefit of both.

And I think the other aspect that's really important is that when we look to industry on some of these decarbonization efforts, the energy efficiency efforts, we also have to recognize that there are applications in the residential, private sector that will also yield significant benefits. And so, for instance, there is a lot of talk about heat pumps being utilized to replace air considerations. We know from an energy efficiency perspective that's going to be a great way to address some of the decarbonization efforts. And it will also help us reduce a lot of the NOX emissions.

So I think it's really important that we again look at what are the immediate requirements, how do we plan for the long-term requirements, recognizing that we need to get some of those immediate benefits. And the way that I see that happening is really through collaboration to recognition of what are those -- for instance, Clean

Air Act requirements, whether it be for oxides of nitrogen NOX, so that we address ozone, or whether it be for particulate matter.

And the fact of the matter is that we see air quality becoming more difficult as we see a warming climate. And, you know, this was certainly predicted by the -- I think in the Fourth National Climate Assessment that put forward where they saw rising temperatures across the west. And so it's important that we tackle the two issues together, not losing sight of the impact that one has over the other. And so I think in that sense again the coordination aspect and really the utilization of those cleaner fuels at scale and getting them out in a way that really gets us to benefit as opposed to sort of some of these demonstration projects.

We have a good sense of technologies at work. Let's invest in it. Let's get those benefits and really move out in that sense. And I look forward to answering any questions that you may have on that, so thanks, Dr. Kissock.

DR. KISSOCK: Yes. Thanks, Wayne, and thanks for calling out some of the economic and the social justice and the health aspects and how interrelated this is, as we make this transition.

MR. NASTRI: Thank you.

DR. KISSOCK: Our last speaker is Catherine Reheis-Boyd. Catherine is President of the Western States Petroleum Association. She's worked as an Environmental Consultant for Getty Oil and Texaco. She manages a broad range of association activities, including legislative and regulatory issues associated with transportation fuels policy, air and water quality, climate change, renewable fuels, and alternative energy issues.

Thanks for being here, Catherine.

MS. REHEIS-BOYD: Thank you, Doctor. And also I tried to undo my video and it says I cannot because the host has stopped it.

Ah, there it is. Is it on now? Can you hear me?

DR. KISSOCK: Yeah.

MS. RAITT: Yes, we can.

DR. KISSOCK: Both your audio and video are now working. Sorry about that.

MS. REHEIS-BOYD: No problem, no problem. Well, thank you. I appreciate it, Dr. Kissock, Commissioners, the CEC staff.

As WSPA, we represent the oil and gas industry, and we provide certainly reliable and affordable fuel in the five western states that we operate. And, frankly, we do that because we meet consumer demand. And, most

expectingly and excitingly for me, frankly, is to represent our members on the innovations of the future that are going to meet the carbon neutrality goals that we've all been talking about. So that's very, very exciting.

And I also just wanted to note that I appreciate the Commissioners and the CEC for having -- well, frankly, as Lance said and many have said, this very critical conversation around pathways to create carbon neutrality in California, because we really have to get this right. There's just too much at stake not to. And none of this, as we have all talked about all day long, is easy. So there is a lot of things to take into consideration. And we have got to really avoid the unattended consequences. And I know we all want to do that.

And the other thing is, as Lance said, I think we all want and need to be part of the solution. And, Wayne, I really appreciate your comments and emphasis on reliability as part of the transition. And you and I certainly are working on a lot of those challenges together, so great to see you.

There are four points I really to talk about, and if you would go to the first slide. And first I just want everyone to recognize that our industry, our members, we are invested in a shared energy future. And it's

whether it's efficiency, whether it's conservation, whether it's a drop in air emissions from methane and flaring, whether it's through advanced technologies, or collaborating with universities on new technologies to reduce energy intensity, or frankly even lower emissions in shipping fuels, we're involved in bioenergy and CCUS to create carbon negative power in places like Mendota, California. We've got companies using ag waste, biomass into renewable synthetic gas to generate electricity.

We're looking at looking at generating carbon neutrality load electricity in Bakersfield. These are all things that our members are involved in. We're involved in turbines and -- wind turbines in farms and, frankly, doing a lot of R and D and testing and evaluating solar technologies for low carbon electricity; and using -- excuse me -- geothermal for electricity as well. I'm fighting a little cold.

But whether -- and the other big thing we're doing is renewable diesel. Of course you are all aware of the two traditional refineries in the Bay Area converting to renewable diesel, Marathon and Phillips. And we're also looking at renewable natural gas, hydrogen, algae biofuels, and investing in next generation battery technology.

And why do I tell you all of this? Is because

we are in it all and we've been in transition, as I often tell the media, since horse and buggy. It is really part of our DNA. And I am going to be submitting too as part of this conversation to the written comments a catalogue of all these grant innovations and projects that our members are currently doing and are underway so you can see them very specifically, not just enough time to go through them all here. Next slide.

The second point I want to make is the importance of the definition of carbon neutrality, and this is really, really important. So we've got to consider defining it as net zero versus absolute zero emissions, because net zero means you get to balance emission sources with negative emissions or emissions removal, like the IPCC goals to achieve, frankly, a balance that is between anthropogenic emissions by sources and removals by sinks of greenhouse gases. Both of those are very, very important. And both the IEA and the IPCC believe that carbon neutrality cannot be achieved without leveraging these technologies that capture and/or remove emissions. And that is why we are so much about CCUS, right, it's so important in this conversation and why the IPCC puts so much emphasis on it.

In the next slide we can see the CCUS in numbers. I just spent all day yesterday listening to the

workshop that CARB held on CCUS and it was noted at that workshop that we would have to increase CCUS tenfold to reach our 2050 carbon neutrality targets. That's a big number.

And another panel number I think noted that CCUS, as a technology, could address up to 54 percent of the global emissions. They talked about a couple of different scenarios and one was that CCUS capacity requires 52 times the growth to meet our 2050 goals. And even the IPCC scenario noted 193 percent increase would be needed. So all that being said, we've got to have CCUS to meet our carbon neutrality goals. And it doesn't matter if you're reducing emissions from sources or you're removing emissions from the atmosphere, I think everybody knows that CCUS is going to be a major, major, major focus and central theme of the international conversation at COP this year. And we will be attending this year as we did at COP 25, so very exciting that that conversation will continue and that the U.S. and California will be rejoining. Slide 4, please.

The third point is how to get to a carbon neutrality economy through pathways of successful CCUS. And some approaches, frankly, are better from a cost-benefit perspective than others. There are some low-hanging fruit that we should consider pursuing and

encouraging. And just like Cap and Trade, which we did support, the aggressive movement on the Cap and Trade program, we put an economy-wide cap on carbon and then we allowed the market to identify the low-hanging fruit. And we've got to do the same here. We should consider looking at addressing this economy wide and on the broadest geographical terms practical, while, as you've heard from many of the panelists, we incentivize the most cost-effective emission reductions.

And there are other panel members who talked about the Low Carbon Fuel Standard, talked about its relationship to innovative crude and the refinery investment credits, would I won't duplicate that, but it is why it is important that in our opinion we consider an all-of-the-above energy strategy to achieve these very aggressive goals so we're able to sustain them over time and we can respect consumer choice and affordability.

I just was reading a Pew Research Center pole that was concluded in April and they found that Americans favor using a mix of energy sources to meet demand. And it's not an either/or scenario as innovations in the private sector have shown all day long in all the conversations we've been having.

So options lend themselves to cost-effective choices. And many of the poles point to affordability as

the number one issue. So let's continue to explore a diversified energy portfolio as many previous IEPRs have done. I don't know how many IEPRs I have been through in my career now, but definitely more than on my two hands. So we need a diversified portfolio and certainly one that includes electricity but much, much more.

And I don't think I need, I think, point out the few examples that we've recently scene, whether it's the ice storms in the Texas power grid, impacts on all energy sources, the cyber security attack on the Colonial Pipeline, Governor Newsom having to do an emergency proclamation down in Wayne's neck of the woods where we had to have marine vessels who could not plug into shore power because of the issues with the grid. And so we've got to have a plan that we can function in a modern society. And, again, I think we can achieve this by not limiting consumer choice or optionality.

And then the last slide just ties it all together as the importance, from our belief and many of the speakers of an all-of-the-above strategic, because we really believe the future of all of our success, as we do this together, hinges on accepting that. And we should include all low carbon fuels, renewable diesel, renewable natural gas, hydrogen transportation fuels. We should include renewable diesel and renewable jet fuel. We

should include low carbon ethanol. And certainly in addition to electricity-driven solutions, I've got members in all of it, including electricity.

I was very excited to see Southwest Airlines do a press release to advance sustainable aviation fuel, SAF, through two new energy partners that happen to be my members, Marathon and Phillips 66, so that was very -- pretty cool.

So in closing, and I know we'll do a lot more in the roundtable, but I just want to point out that really from our perspective the way to get to a sustainable carbon neutrality is to really certainly keep those aspirational goals but please do not ignore the technical realities that many have talked about today or the low carbon solutions that are on the table today, because we will need them all to get there. So thank you very much, look forward to the conversation and appreciate you having us.

DR. KISSOCK: Well, thank you, Catherine, and thank you for sharing some of the great investments in low carbon fuels and the portfolio approach that your organization advocates.

At this time I would like to turn it back over to Commissioners McAllister and Monahan for follow-up questions.

COMMISSIONER MCALLISTER: Thank you, Kelly, really appreciate your moderation. And actually I would invite you to ask questions that you may have as well as, as an expert in this field. I think that could be very helpful. Not to put you on the spot, but I think, you know, your expertise is also in the room and we'd like to take advantage of that here.

I will just ask one question, mostly for Wayne Nastri. So thanks for being here. I'm really glad you're on this panel. I think that complements the others very well.

And I'm curious, you mentioned sort of, you know, we need to pool resources. And if we -- I totally agree with you, the infrastructure funding and any other general funding coming out through the State could help move the ball forward here. I guess in terms of the Clean Air Act authority, the noncompliance sort of requirements, and the authority that unlocks for the State, is there in that expectation that that -- that there is some access? You know, I think we all recognize that it's really difficult to get into kind of loads and compliance in California, just given all the -- sort of the missions and you have very few places to go to get additional NOX emissions -- production, as you pointed out. So is there a pathway to sort of get some resources to -- federal

resources to that to help us comply or is it really more of a stick approach?

MR. NASTRI: No, there is a pathway. I think they really focus on a few things. One is federal action. When we look at the NOX sources and, as I mentioned before 80 percent come from heavy-duty trucks, and it's those out-of-state trucks. California has really been in a leadership position when it comes to developing clean truck and bus standards, but the fact of the matter is, you know, in Southern California we have the gateway to the nation from a goods movement perspective. Nearly every Congressional district can trace something back to our port. So while we share the burden of the ocean-going vessels and the trucks and all the related sources associated with goods movement, we don't get a pertinent investment in that clean technology.

And so there is really a twofold approach that we're pursuing in D.C. right now. One is the Heavy-Duty Truck Standard hasn't been revised in 20 years. And so the federal government has to move on that. We are engaged with a number of air agencies throughout the United States through the National Association of Cleaner Agencies, as well as other groups that is, in essence, putting pressure on the administration to fulfill its goal to develop and to get that Heavy-Duty Truck Standard out,

at least a draft by this year and finalized by next year.

You may say, wow, that's really fast, but the fact of the matter is we had actually put in a request in the Obama Administration. At the very end, you know they said they would get to it but they really couldn't commit the administration. The administration after that and the administration after that really didn't get much done. So, you know, we're behind the eight ball on trucks, but we also have locomotives, we have planes, and you have ocean-going vessels.

Ocean-going vessels and the ports is going to be the largest source of NOX emissions for us. And, again, it's a very limited area where we have authority, so it's up to the federal government. So really pushing the federal government to exercise its authority not only here in the United States but also, for instance, through the IMO, the International Maritime Organization, and other bodies, especially when it comes to planes and aspects. They're so important.

So it's the regulatory approach, but there is also the incentive approach. Because, as I had said earlier, we can't regulate, right, when you look at at least a four-year delay from when you can set a standard and when you will actually see that technology deployed. That's why I say at 2023 it's going to be almost

impossible to meet the attainment date, and 2031 is going to be hard-pressed. So we have got to deploy technologies that are proven.

We know that we can see a 90-percent cleaner natural gas vehicles in an interim process. So if we can get a 90-percent cleaner vehicle out today, we would much rather do that, because if someone is not getting a cleaner vehicle and if they can't get a heavy-duty electric truck in the timeframe that they need, they're going to go to diesel. And that's going to continue to exacerbate the problem that we have.

So we're trying to make sure that there is no more diesel building. And so from the federal government side, we want to see incentives, for instance on the excise tax. You know waive that for zero-emission heavy-duty trucks or near-zero heavy-duty trucks. Invest in the infrastructure.

You know in the emergency proclamation the governor issued, they talked about a 2500-megawatt shortage for this year, a 5,000-megawatt shortage for the next year. The impact that these battery-electric heavy-duty trucks are going to have on the grid can't be overstated, in our view. And so that's where I talked about the reliability, because if the grids go down and we're losing reliable clean power to dirty backup diesel

generators, it's going to be even more difficult. And then that goes to those local communities.

So to your point, send letters to Congress, send letters to the administration. We've got to have those investments in those clean technologies. And it's really incumbent on the federal government to step up it's role and responsibility in us meeting those obligations.

COMMISSIONER MCALLISTER: Thanks. Thanks, I appreciate that. You sort of answered, by the way, a question that's in the Q&A right now from a listener, so appreciate that.

And I would just offer, you know, NACAA and NASEO, the National Association of State Energy Officials, and NARUC, obviously the Regulatory Utility Commissioners, I think could be outlined in this. Certainly NASEO, I'm assuming -- I can't speak for NASEO itself, but as a member and an officer, I think, anyway, that we can collaborate on that federal discussion across states, you know across coastal states, for example, with the ports, I think could be in the offing, so I would follow up on that.

MR. NASTRI: Yeah, that's great.

COMMISSIONER MCALLISTER: Yeah. I wanted to -- lots of great stuff. I guess, and just I heard from I think all of you that reliability really is job one, and I

completely agree. I think, you know, obviously we're pitching a lot of pressure this summer, but if we don't get the reliability piece of it right, then that's going to take a lot of tools out of our toolbox and we just can't afford that. And so I think we all are in agreement on that.

Commissioner Monahan, did you want to have -- did you have any questions for our panelists?

COMMISSIONER MONAHAN: Well, maybe a comment and a question. But I really appreciated what Lance and Nora were saying about the need for -- you know, these are big energy -- for big energy-intensive industries, they are very mindful of the cost of energy. And yet at the same time what we're hearing at least from U.S. EPA is that energy efficiency remains sort of the low-hanging fruit in terms of opportunities in the industrial sector.

And I wonder if you could share with us, well, first, any observations that you have about barriers to increased energy efficiency in the industrial sector. And then, second, maybe to what Cathy Reheis -- Catherine Reheis -- Cathy -- call her Cathy, we're thinking about the role of CCUS and how you're seeing carbon capture playing into strategies for reducing carbon.

MS. REHEIS-BOYD: Yeah, and I certainly can just comment on the -- I mean when we look at the refining

side, and I think, Commissioner, you asked a few of these questions on an earlier panel, but CCUS on hydrogen plants and using renewable natural gas in the plant can actually deliver a negative CI. So that's one area that we're really looking at. And, again, if we do some kind of interagency stakeholder group that we talked about in previous panels, I think all of these things we should dive into deeper to see, you know, if these are things we should be doing, how do we go about doing them.

I think the other thing we've looked at is renewable propane that comes from the renewable diesel production process as an opportunity. You can also use renewable natural gas in heaters, you can look at things like electrification of steam turbine drivers.

There is also a thought of coprocessing of other non-bio feedstocks like Fullerton, which converts municipal solid waste into a synthetic feedstock. So there's just so many things that for our sector we're looking at. And I think in that kind of a forum with the Energy Commission and others, we could really begin to rank those and is the which ones are the most cost-effective to pursue and which ones give us the biggest bang for the buck, as we look at the industrial decarbonization.

COMMISSIONER MCALLISTER: May I ask a follow-up

question on that? I really appreciated at the COP actually we had some interesting meetings around CCUS and I think there are other jurisdictions are ahead of us on that, it's pretty evident. But I always -- you know, when there is a complex picture in front of us, you know, sometimes it's useful to figure -- count the molecules, go back to first principles, how many molecules and where are they going, and we sort of track those, I guess. And there is a concern about lock -- like in the nearterm if we invest major capital into a pathway that ends up being hard to decarbonize because maybe we don't have all of the pieces of the puzzle in place in the nearterm, you know, then that's not obviously an optimal path.

I wonder in terms of identifying the sort of -- you know, derisking as much as possible or sort of precautionary principle type approaches, you know, what are your thoughts about the conversation, what that conversation could look like in terms of, okay, we know we're going to need -- to pit away from fossil molecules, and mostly and then the ones that are left over are going to have to have some sink, I'd be interested in people's views about what that conversation could look like, essentially having an out-of-state planning conversation.

MS. REHEIS-BOYD: And, Commissioner, that was mostly with CCUS in particular or more broadly?

COMMISSIONER MCALLISTER: Yeah. I mean I think, you know, opinions differ widely on that issue. And I want to -- you know, I'm kind of inviting a little bit of strategy thinking about how to pull that conversation together.

MS. REHEIS-BOYD: I mean I can jump in and certainly others can as well, but I think it's a super important one to your point because we know from Lawrence Livermore and from the Air Resources Board that even if we do everything that's in the scoping plan, without CCUS we can't get there.

I mean so -- so when you go in with that, it's like, okay, it's not as if we have a choice as far as we've got to figure out a way to do it in the state. And we've got to figure out a way to have a good conversation with the environmental justice community who, frankly, is very opposed to even the conversation. And that's probably on both sides, we haven't done a good job of communicating what it means, what it is, what it isn't, you know, all of those frustrations that come from all of us not speaking over each other instead of with each other, right? And so I think it's challenging for sure, but it is essential as we figure out how to meet these goals.

And I think it's been unfairly portrayed as a

way to, you know, continue fossil fuels when there is so much more that is really associated with carbon sequestration and storage and utilization. It's the whole picture that I think we need to demystify for that conversation to proceed. So I am worried about the conversation.

I sat through the whole day on it with CARB and there was a lot of opposition from our environmental justice friends. And I think it behooves us to figure out what that opposition is about and how can we work together to demystify it and really put on the table how important it is for the state to meet these goals.

MS. SHERIFF: I would like to second exactly what Cathy -- what Cathy just said. The carbon capture, utilization, and storage, sequestration, it has to be done. And I think having an interagency/industry/EJ sort of working group start up sooner rather than later to have a clear, frank conversation about it will help us get there, but we have to get there. We have to have that onboard. It's important for the refining sector, for the oil and gas production sector, for the chemical sector, for the cement sector, across industry it's critical.

MS. REHEIS-BOYD: And, Nora, to your point, I mean even as certainly all the Commissioners know, even with the Governor's Executive Order that stops the sale of

internal combustion engines by 2035, in 2035, as Wayne knows, we're still going to have a boatload of them, right? And so it's not like we can figure out -- we can stop fueling them for the short and midterm as we transition to something else. And so, you know, why wouldn't we do that in a way we can decarbonize? But if not, I mean -- and, you know, to Wayne's point, we're leaving a lot of emission reductions on the table for the very cements that we should be doing them because we're leap-frogging over everything with a focus on a single technology. It's a great technology. We're investing in it, but we have got -- we have got to diversify along the way if we're going to get there and have those realistic conversations that at least in the nearterm we've still got a lot of cars and trucks to fuel in the most carbon -- decarbonized way possible. And that's just not going to just be electricity in the nearterm.

MS. SHERIFF: And renewable natural gas is huge with the negative carbon intensity, depending on the feedstock for the RNG is huge, so.

MS. REHEIS-BOYD: Yeah.

COMMISSIONER MCALLISTER: Yeah.

DR. KISSOCK: Folks, I think we have one minute left, and I think Commissioner Monahan asked a great question to Lance and he didn't quite get a chance to

answer, but she asked about leaving -- you know, about some of the energy efficiency that's still left on the table.

And I was wondering if you could just share your -- your ideas, Lance?

MR. HASTINGS: Yeah, I'll kind of begin where I began. People don't sleep at night worrying about lose of energy at a facility. I mean literally that is their job. And the larger the manufacturing facility, the more likely that you have a person or persons or a department focused on it.

The smaller operations is where the opportunity might be, and those are the ones that, you know I hate to say it, might be most disconnected from this process because they're trying to keep their doors open, the lights on, and people paid. And that's where the incentive might be the best place to identify -- I heard that compressed air situation today, which is kind of ancillary. It's interesting because it's energy that's necessary to keep those compressors going, that if there is a leak the compressor needs to run more often. So if it's the air that's leaking, then they're wasting some energy. So I think areas there.

But in terms of the big bucket, I'm not sure you're going to find what you're looking for in those

spaces. It's the larger users, the larger manufacturers that are truly -- they are measured by their efficiency of input and output. And I did bristle a little bit this morning when I heard that initially. I'm not here to refute the data, but it's not as prevalent as we would think. Because that's the equivalent of leaving your house with the hose on your lawn all day and then getting home and realize, oh, I left my water on all day. That just doesn't happen. So, you know, having said that, let's find a way. If there is a low-hanging fruit that needs to be plucked from the smaller manufacturers, let's go after that, but it's not as prevalent I don't think as was mentioned.

MS. SHERIFF: And if I could just add to what Lance was saying, exactly the low-hanging fruit has been picked, but I'm also going to channel Steve Coppinger, who's still on -- and, Steve, please, please add to anything that you might need to -- but California used to set the gold standard in terms of its energy efficiency programs for industrial customers, and we have lost our way on that. The process at the Public Utilities Commission for custom projects is torturous. They, you know, used to change the goal post after you had submitted an application, committed the company's funds, and it is -- that has been a significant barrier in addition to the

costs. And my hope is that with this new industrial decarbonization we can look to some of those big bang for the buck energy efficiency improvements that really do cost a lot of money but you really do see some significant efficiency gains.

And, Steve, if you have any specifics you'd like to add there, you're the one who went through it.

MR. COPPINGER: No, I think it has become much more of a challenge right now to get any kind of funding for energy efficiency. And if something has been done before within the industry, for example, that no longer applies for an energy efficiency incentive. So to me, if you want to reduce energy -- or improve energy efficiency, you want to do it across the board regardless of whether it's been done before. And it's right now challenging I think for large industrials to qualify.

And, as Nora said, I think California had the gold standard of energy efficiency programs several years ago, where I know that we took advantage of a lot of the programs. And the incentives put us over the edge of being able to do some of these projects, so.

COMMISSIONER MCALLISTER: So thanks a lot for that. And, Kelly, I think we do have some time. We don't have any open questions from the public, so we do have a little while longer.

And I wanted to just thank, just sort of acknowledge those comments. And I think, you know, there is an interesting conversation started -- starting that is really looking in the context of electricity rates, to sort of figure out maybe if there is a different way to slice and dice the program funding pie and maybe not count on the sort of efficiency portfolio, as it historically has been conceived, and actually move off of the rates and sort of find other sources of funding. And I think, in particular, it may revise and some of the conversations sort of reflect that drift or that -- that change in direction.

And we haven't mentioned the money, the funding that may be coming to the Commission for hydrogen work, that is the State from industrial. So both of those are relatively important pots that may be coming for programmatic initiatives that do I think help, that would be relatively flexible compared to the programs that you're used to. So, in any case, those discussions are TBD, but I think they do have some hope.

I wanted also to ask about -- so another thing that's happening is that the demand response program environment in the State is having a rethink. And so the Public Utilities Commission has asked the Energy Commission to do some work in that regard. You know we

have a lot of tools around load flexibility that we're funding research about and then also working with stakeholders out there.

Certainly the cold storage has a lot of load flexible potential, compressors possibly, a lot of variable loads out there. We talked about some of that in the previous panel.

I guess I'm wondering -- and, again, you should feel free to talk about the issues that you face in participating in some of these programs. But, you know, also I'd ask you try to keep it sort of solutions oriented, like what would make them work better if you do have challenges participating, but demand response, in particular, I know CLECA has a long history of participating in demand response. And some of the large loads really are key to enabling demand response at some scale that can help move in and deal when we -- on those days when we really need it but perhaps even as a more routine matter and with some automation. So I wanted to just -- I guess mostly this is directed towards Nora, but anybody should feel free to answer.

MS. SHERIFF: So, Commissioner McAllister, your point about maybe there's something that can be done on ongoing basis, that gets exactly to what I wanted to say when you say and demand response, let's talk about demand

response. There used to be a program called the Demand Bidding Program that was an ongoing whatever you can bid in, day ahead -- sorry -- yeah, day ahead, so for the next day whatever you're -- you know, where you were in your production cycle, how much load could you bid in and say, 'If you need it, this is what I can draw,' not the 'All hands on deck, it is an emergency, drop your entire load' or 'as much of your load as you possibly can very quickly,' which is the basic drop your program, the reliability demand response that we need in these extreme heat events.

But that ongoing 'What's your economic amount that you can bid in' day after day after day has been gone and not an option since 2015 for PG&E, since 2016 for Southern California Edison. It was extended a year for Edison because of the Aliso Canyon Natural Gas Storage Field not being there, and they saw that as an important tool to maintain flexible operations. There has not been a replacement program for that ongoing economic demand response that could be available from industry for years. And we have been -- CLECA has been asking for it, has been suggesting pilot programs be instituted, etc. And we have not seen anything.

So I think, yes, the importance of the reliability demand response in an emergency is known and

it's critical that we maintain that program, but we also need an ongoing what can you do on a day-ahead basis, you know, depending where you are in your manufacturing cycle to help manage the grid every day, and that I think is a clear failure that we've been seeing for the past several years, that we still don't have a replacement for that program.

COMMISSIONER MCALLISTER: You mentioned the need for relatively capital intensive projects to move the efficiency needle. Could you get into a little bit more -- -

MS. SHERIFF: So like to put -- new boilers could be like $5 million per site. Efficient air compressors could be up to a million dollars per site. If you're looking at changing your -- your process, that can run into the millions, doing that deep dive into your process and what process changes you would need to see. So it -- I think we need to move beyond lighting, right?

COMMISSIONER MCALLISTER: Yeah, oh, absolutely. So, yeah, you referred to those in your comments, would --

MS. SHERIFF: Yeah.

COMMISSIONER MCALLISTER: -- I wasn't -- I wasn't quite connecting those dots, so thank you for that.

MS. SHERIFF: Yeah.

COMMISSIONER MCALLISTER: And anybody else want

to chime in on sort of what -- great, Lance, go for it.

MR. HASTINGS: Yeah. If I could, and I don't mean to be purposely provocative, but we claim to be the fifth largest economy in the world trying to find our way to be the sixth and a lot of that is because of the infrastructure that we have is not fit for purpose or suitable for today, let alone tomorrow. And that -- and, you know, I came to this role from -- I've been in California most of my career, but I was on the East Coast for a time. And the headline right after I accepted this job was announcing a PSPS event, and it was based on wind in the foothills. And I shook my head, you know, what's happening to my California that I knew. And if we have an infrastructure that is not able to accommodate just our daily needs, it's really challenging.

It's nice that we have programs, it's nice the Governor announced that -- a plan last week, on Friday, you know, to see us through, but that's a band-aid being put on a hemorrhage. And we really have to have a much more serious discussion about infrastructure, because, I know this panel is focused on the air quality and carbon in the future, but it is all of that all at once, and we can't have these one-off conversations. So if we don't have a reliable let alone affordable -- affordability might be a separate, later discussion -- we need a

reliable network of energy in this state so that we can do what we do. And that is a lacking and important cog really in the economic wheel.

And I would have felt bad if I didn't say that today. We got the opening right there, and I just had to mention it. We've got to look at all of these issues because they are all interrelated. You know if we're going to be the largest economy in the U.S. and globally at number five, we have to back that up with just not looking at the GDP numbers. And there is inherent within that an infrastructure sense that really needs to be addressed.

COMMISSIONER MCALLISTER: Thank you.

MR. HASTINGS: Sorry.

COMMISSIONER MCALLISTER: Appreciate that -- no, not at all.

And unfortunately Commissioner Monahan had to drop. She's having audio issues, so maybe she will reappear.

Professor Kissock, did you have any, do you know or do you have any gaps --

DR. KISSOCK: Yeah.

COMMISSIONER MCALLISTER: -- that you want to address or questions you want to ask our panel?

DR. KISSOCK: Yeah, I'd just like to follow up

on the direction of the conversation because it's so intriguing. But, you know, Wayne and Nora and Lance, you know, you've all brought up reliability issues, and I think others also, so that's, you know, certainly core. I think when Commissioner McAllister said we're going to start there and go forward, but a lot of times, the way I see it, is that -- is that things really move forward when you hit two birds with one stone.

And, Nora, you brought up the Load Bidding Program and, essentially, if we can look at industrial electrical demand, not just in terms of an emergency event, okay, but load shaping, there is enormous potential as more and more renewables come into the grid to also reduce the carbon intensity of the grid. If we can load shape industrial processes to use energy when we're generating a lot of renewable resources, so, you know, and as we do that, we also help the reliability problem.

So I guess my question to any of the industrial folks out is what do you think the potential for load shaping is, for really pushing demand around to both improve reliability and to reduce CO2 emissions?

MS. SHERIFF: Well, I will take a stab at that. I think from an industrial site, it's going to depend on where they are in their manufacturing cycle and their commitment to their customers and their economic supply,

so it's going to vary. But the Demand Bidding Program had, you know, over a hundred -- well over a hundred megawatts participating in it on a regular basis, sort of day in/day out, day in/day out. And I think that could only, you know, grow and be a higher number.

I think there are some complications when you look at other industrial sites where you might have multiple meters and how do you disaggregate the loads because you don't want to go in and meter every single load. You need to have a more elegant solution than just slapping on meters. That's pretty costly to use meter after meter after meter. Also in some sites it's not physically possible to install a meter on a certain load.

But I think there really needs to be -- there definitely needs to be some really clear thinking about what we can do with industrial demand response, economic demand response, that ongoing demand response that's not emergency DR. There has been a lot of focus on the residential sector with the smart thermostats, etc. And I'm not saying that's not a good thing, but I think it's been short-sighted to not have a similar focus on the industrial side.

And the working group that's been stood up, Commissioner McAllister, I think is, you know, the short term nature but it's looking at a product, a report by

March of 2022 on counting methodologies, it's not broad enough to encompass this -- you know, this concept of an economic DR program and how that would -- how that would work.

DR. KISSOCK: Yeah. You know, thanks, Nora. You know, it occurs to me that again the Load Bidding Program, that kind of stuff, but perhaps we could get broader participation with some sort of realtime pricing, you know more realtime pricing rates, which just incentivize people to move away from the high price times, which are also the high CO2 times.

What do you think the appetite is for realtime pricing in industry?

MR. HASTINGS: I will start there real quick and just say many of our operations are 24/7 and we don't have that luxury or that option to move things into the evening when the power might be a little bit less expensive. And it just seems that would be the challenge for 24/7 for efficiencies, so that's the ultimate irony, right? You're here at your most efficient, but the energy quotient isn't keeping up with that efficiency because of the pricing, the way they work.

DR. KISSOCK: Yeah, I understand that. And I understand that's a constraint for 24/7. But, you know, as we know, a lot of places aren't 24/7. And there's also

various forms of industrial capacitance, that there's work around. You know, there is work in storage and Commissioner McAllister talked about some of the thermal energy storage opportunities in cold storage warehouses and things like this. So, you know, I think there are workarounds.

Lance, you know, you -- if I may ask just one more question, really a follow-up to what Commissioner McAllister asked, and that was that when we talked about energy efficiency not being funded and when you go back and you work in this industry or you read the Department of Energy reports, they say, you know, what are the barriers, and number one is financial. And you say, well, what's the biggest barrier in financial, and they say it's a competition for internal capital. And that maps what I've seen too. Earlier we saw people talk about, well, there are these energy efficiency opportunities, but only these got funded.

And really it's this, in many case, it's this competition for internal capital. So I'm wondering, you know, to you or anyone else if there are policies that could be developed to help unstick that, because I think that is where a lot of this gets stuck. You know, you -- Lance, you keep talking -- not keep talking, but you mentioned how on the floor people are really trying to do

things, but oftentimes the place we lose is in the decisionmaking process about what gets invested in next. Your thoughts on that.

MR. HASTINGS: Maybe we could pivot the debate and say let's look at the high-hanging, the things that are way up there that really would drive the debate. So if there is an internal discussion, that things are on the table to make it the most efficient which is the hardest increment to get, that might be a good place to start. Might be, I guess, fewer in number but greater in outcome, if we do that, because the, you know, the high-hanging versus low-hanging fruit, it's a cliché, but that might be where a lot of the resource might be made available.

I just don't know what those high-hanging fruit are. It could be different in every operation or there could be something that's just unattainable without any support for --

COMMISSIONER MCALLISTER: Can I ask -- can I ask along these lines: Is there any traction, what's sort of the off-balance sheet approach for getting private capital at a longer -- kind of a longer return horizon into, you know, a relatively large process-related investment in an industry? And what do your members say, Nora or Lance?

MS. SHERIFF: I would have to ask Steve Coppinger if he --

DR. KISSOCK: Okay, the same thing.

MS. SHERIFF: I haven't -- yeah, I haven't had any recent conversations with the CLECA members on that. I know we talked with Edison a couple years ago when they suggested their -- their approach. And I forget, I think it was Derek mentioned, they didn't have any takers on that.

Steve, do you want to offer anything on that off-balance sheet approach?

MR. COPPINGER: Well, one thing that helps is certainty and a lot of times when you're planning these larger process projects, it takes years. Not only permitting, but it's years of engineering, planning, and so it helps to have some sort of certainty on the funding and knowing that it will be available, you know, when it comes time to execute the projects. But that's basically what I would say at this point, that it's a challenge.

COMMISSIONER MCALLISTER: So is that a topic that's worth keeping sort of on the agenda for any convening we might be going forward, do you think, or not really?

MR. COPPINGER: I think it is worth talking and I think any time you have opportunities to incentivize people, to take their extra step to do the efficiency projects, yes.

COMMISSIONER MCALLISTER: Okay. All right, well, great. Well, I promised Heather that I would wrap it up about three minutes ago. So I think we do have a little bit of space for public comment and I want to give a few minutes for that to take place. I'm not sure how much we have, when we're going to have any public comment, but we want to create some opening for that.

So I want to just really say thank you to all the -- for the panel. It's -- this has been a great session. And to you and all the panelists previously today, thanks a lot for your expertise and knowledge and participation here. I'm really optimistic that we have a great platform with the prospect for programs that really move the needle going forward. And it's a little bit -- feels a little bit like a new day, especially with the urgency around the needs of the -- of our energy sectors broadly, but particularly our electric sector. I think there is an opening to really have this conversation in earnest and hopefully we can take advantage of it, so. So thanks again, everyone. Appreciate your being here.

MS. SHERIFF: Thank you.

* COMMISSIONER MCALLISTER: So let's pass it off. Is Dorothy here? Is it Denise?

MS. RAITT: Yeah, Dorothy. This is --

COMMISSIONER MCALLISTER: Hey, Dorothy.

MS. RAITT: Dorothy is here to do the public comment.

COMMISSIONER MCALLISTER: Great to have Dorothy.

MS. RAITT: Thank you again to our panelists as we move on to the public comment period.

COMMISSIONER MCALLISTER: Thanks, Heather.

MS. MURIMI: Thank you, Commissioner McAllister. Thank you, Heather.

So starting off with just some instructions for everybody. One person per organization may comment. And then comments are limited to three minutes per speaker. I will start with folks on Zoom. If you are on Zoom, use the raised hand feature, and it looks like a high five. And if you're calling in on the phone, if you dial star 9 to raise your hand and then unmute on your end, you unmute by pressing star 6 -- apologies.

So we will start with folks that are on Zoom. I see Hugo Mejia. And apologies if I have misstated your name. You may now begin your comment. State your name. Go ahead, Hugo.

MR. MEJIA: Just want to make sure you can hear me.

MS. MURIMI: Yes, we can, Hugo. Thank you.

MR. MEJIA: Oh, yes. Thank you. First of all, I want to thank the Commissioners, staff, and really the

speakers this afternoon, so thank you very much.

My name's Hugo Mejia. I am the Engineering Hydrogen Manager for Southern California Gas Company.

Just my statement here: According to the Governor's Office of Business and Economic Development, California leads the nation in economic output from manufacturing and is a home to over 35,000 firms employing 1.3 million people. Despite advancements made in and marked in segments, industrial sectors such as thermal load-dependent processes in manufacturing have yet to see energy options that can help them transition to a decarbonized future.

According to a 2021 report by Brookings Institute, heavy industry sectors like steel, cement, and chemical manufacturing are among the most difficult to decarbonize because of high-heat needs and economic hurdles like low profit margins, capital intensity, long equipment life, and swings in international trade.

Funding a project of an isolated steel transmission pipeline with hydrogen blend to a heavy end-user, like manufacturing, would provide the California Energy Commission with valuable data on both pipeline and end-use equipment in sectors crucial to California's economic competitiveness.

Thank you.

MS. MURIMI: Thank you, Hugo.

Let's I will check for hands again. Again, one person per organization may comment. And if you're on Zoom, use the raised hand feature, looks like a high five. You could find that at the bottom of your screen. If you're on the phone, press star 9 or star 9 to raise your hand, and star 6 to unmute on your end.

We'll give that one more moment.

Seeing no other commenters, Heather or Commissioner McAllister I will pass the mic back to you.

COMMISSIONER MCALLISTER: Thank you very much, Dorothy.

Well, let's see, I would really invite people to make written comments to the docket. And Heather, the team can put up a slide for that.

I want to -- I won't try to summarize everything that's been talked about today, but I know our after has been taking great notes. There is a recording of this session and there will be a transcript, I believe, and so we really have a lot of material to work with. I want to just thank all four of our groups of panelists and our moderators for a really great day.

Again I do really feel like we're starting a conversation that's going to have a big impact in our state and giving this broad topic of industrial

decarbonization, I think, the gravatus that it deserves to help that sector thrive as a fundamental part of our economy in California and really appreciate it in all its diversity and really segment and target not just the biggest opportunities for decarbonization, but really the places where we can establish partnerships that last. And I think we are kind of at -- it feels like we're at a little bit of an inflection point, so hopefully that is the case. We have a lot of expertise in the state and we have a lot of, I think, really proud California industries that we can work with to move towards our collective goals. And so lots of challenges.

You know we've heard about a number of barriers today. We've heard about a number of success stories and potential areas of improvement. So really all together that gives us a lot of material and a lot of substance that we can work with and hopefully shape in this IEPR to help give us some strategic importance to it and then move relatively expeditiously into forming programs that have funding behind them to begin to chip away at this problem and really target the highest-value solutions.

So it's going to take some resources, but -- and I think we all acknowledge that through the course of the day, but we are California, we do have an innovation economy and we want to keep it that way. So I want to --

just again thanks, thanks to the IEPR staff and the Division staff who really contributed to putting this together. David and the rest of the crew.

So, again, I think that's it. Anything I missed, Heather?

MS. RAITT: No. You did a great job. Thank you.

COMMISSIONER MCALLISTER: Thank you very much. And you too. The feeling's mutual, on the team again, and looking forward to comments on August 17th, and to further collaboration going forward. And I think that's it for today. We are adjourned.

(Whereupon, the Workshop was adjourned at 4:28 o'clock p.m.)

REPORTER'S CERTIFICATE

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

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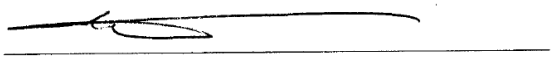

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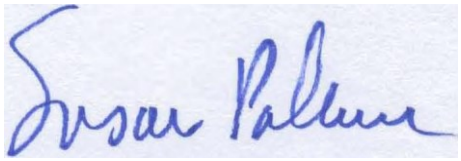

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