DOCKETED	
Docket Number:	21-IEPR-05
Project Title:	Natural Gas Outlook and Assessments
TN #:	239474
Document Title:	Transcripts - 5-20-21 for IEPR Commissioner Workshop on Natural Gas Infrastructure
Description:	CEC IEPR 5-20-2021 FINAL.
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/25/2021 3:36:35 PM
Docketed Date:	8/25/2021

CALIFORNIA ENERGY COMMISSION

IN THE MATTER OF:	)	
	)	
2021 Integrated Energy Policy	)	
Report(2021 IEPR)	)	Docket No. 21-IEPR-05
	)	
	)	Re: Natural Gas
______________________________	)	Infrastructure Issues

IEPR Commissioner Workshop on

Natural Gas Infrastructure

REMOTE ACCESS WITH ZOOM

The California Energy Commission's May 20, 2021, IEPR Commissioner Workshop on Natural Gas Infrastructure will be held remotely, consistent with Executive Orders N-25-20 and N-29-20 and the recommendations from the California Department of Public Health to encourage physical distancing to slow the spread of COVID-19. The public is able to participate and observe the meeting consistent with the direction in these Executive Orders. Instructions for remote participation can be found in the notice for this meeting and as set forth in this agenda.

THURSDAY, May 20, 2021

10:00 A.M.

Reported by:
Jacqueline Denlinger

APPEARANCES

Commissioners

Andrew McAllister
Siva Gunda
Patty Monahan

Staff Present:

Heather Raitt
Jason Orta
Melissa Jones
Jonah Steinbuck
Qing Tian

Presenters:

Melissa Jones, CEC
Jason Orta, CEC
Kristina Abadjian, CPUC
Eileen Hlavka, CPUC
John Steinbuck, CEC
Qing Tian, CEC
Francois Rongere, PG&E
Jonathan Peress, SoCalGas

I N D E X

P R O C E E D I N G S

MAY 20, 2021 10:03 a.m.

MS. RAITT: All right. Well, good morning. I'll go ahead and get started. Welcome to the California Energy Commission’s Workshop on Natural Gas Infrastructure. This is part of the 2021 Integrated Energy Policy Report proceeding, which we refer to as the IEPR, for short. I'm Heather Raitt, the program manager for the IEPR. This workshop is being held remotely consistent with Executive Orders N-25-20 and N-29-20 and the recommendations from the California Department of Public Health to encourage physical distancing to slow the spread of Covid-19. Go ahead and advance the slide, please.

To follow along with today's discussion, the workshop schedule and most of the presentations are available on the CEC's website. Go to the 2021 IEPR page and by the end of the day we will have all the presentations available. All IEPR workshops are recorded, and both a recording and a written transcript will be available on the CEC’s website within a few weeks. Attendees have the opportunity to participate today in a few different ways. For those joining through Zoom using the online platform, the Q&A feature is available for you to go ahead and type in a question for our panelists. You may also upload a question submitted by someone else. And to do that, you click the thumbs-up icon to upload. Questions with the most votes will be moved to the top of the queue. And we will reserve a few minutes at the end of the presentations to take some questions from the Q&A, but we may not have enough time to address all the questions submitted.

Alternatively, attendees may make comments during the public comment period at the end of the morning. Please note, we will not be responding to questions during the public comment period. Written comments are also welcome and instructions for doing so or in the meeting notice, and written comments are due on June 3rd. And with that, I'm pleased to introduce Commissioner McAllister, the lead for the 2021 Integrated Energy Policy Report. Go ahead. Thank you.

COMMISSIONER MCALLISTER: Very well. Thank you, Heather. Appreciate you and all the staff, as always, for putting together the whole IEPR production, including this workshop. We're still in the early days of this year's IEPR. We’ve already had some really good interaction with various stakeholders and today will be no exception. In particular, I'm really pleased to be joined by the Lead Commissioner over the Energy Assessments Division and for the Natural Gas Track that sits in that division, Siva

Gunda, Commissioner Siva Ganda, as well as Commissioner Patty Monahan, who's our lead on Transportation.

And just a couple of brief comments, really, I wanted to make. You know, this IEPR will look at natural gas from various perspectives. And really the context is to be able to use, the goal through this year is to really use the IEPR process to develop a more complete picture of the Gas system. And as we do that, be very intentional about the data that we're collecting and the tools and skills that we're developing at the Commission, not only to do the forecast, but more broadly to serve as a foundational set of tools for understanding the evolving Natural Gas system and the evolving Gas system as we move forward in our vast California Decarbonization Project.

So obviously, you know, we need tools to look at reliability and safety and all the different aspects of the physical infrastructure of the Gas system. And we need data to do that, and we need models, and we need the skills to collect and run, collect that data and run those models. And so the system integrity obviously is job one and safety. And so obviously we take that very seriously. I'm really proud of our team actually at the Energy Commission, who is a very intentionally building skills and gaining insight into the Gas system, working with the gas companies and all the various stakeholders, and as well as our sister agencies, in particular, the PUC, obviously, which has primary jurisdiction over the vast majority of the Gas system in the State.

So the goal really is to create some transparency and accessibility as we really enter this long-term transition of our Energy systems and to understand the evolving role of gas in that transition. So that toolset really will bring, I think, an appreciation, or models and tools that match the challenge that we face and that also match the abilities that exist in the marketplace. You know part of this, we're a state agency, we need to create some accountability and sort of level set openly and transparently to how we approach the gas system, because this broad decarbonization conversation is really a -- it must be open and transparent in order to find solutions that really will work over time and across the whole state and for all Californians.

So as the Policy and Planning agency in California, we take that very seriously and you know, want to use our work to support the PUC and the ARB as they enter the Scoping Planning Process and really get better over time to help solve barriers to transition as they come up over time. So and as well as specific issues to, you know, we have Aliso Canyon, for example, that needs to be eventually retired. So our gas, our analysis needs to really be able to quantify the impacts and come up with solutions and alternatives for those kinds of challenges that we face.

So with that, I'd just, by way of context and to level set a little bit for today, I wanted to then pass the microphone to Commissioner Gunda.

COMMISSIONER GUNDA. Yeah. Good morning, Commissioner McAllister. Thank you for those opening comments. I also want to begin with thanking the IEPR team for helping host this workshop. It's an important workshop today kicking off the IEPR Track on Natural Gas. I also want to thank colleague Patty Monahan, Commissioner Monahan, joining us on the stage today, virtual dais and our colleagues from the PUC and all the presenters today for taking the time to be a part of this conversation.

I just want to go through high level follow-up on what Commissioner McAllister already teed up. So I think as the State's primary Planning and Policy agency, I think there’s, you know, as you think through the policy process, we kind of think about it broadly in three buckets, right? I mean, we have the Policy Ideation Phase, where you’re ideating the very idea of policies that get us -- steer us towards some end goals, and then you have the Planning and Implementation Phase, and then you evaluate those existing policies, then you come back, you know, into the Policy

Ideation Phase.

So in this cyclical process, I think CEC's role is really in that Policy Ideation and that requires a robust discussion, and a forum, and a venue to have a process that allows for diverse opinions to come together so we could make those informed decisions as we move forward into the Planning and Implementation Phase. So the Natural Gas Track for IEPR 2021 is set up in that spirit to really explore two elements of the natural gas portion, which is to promote the situational awareness of the Natural Gas system as a whole, but some of the emerging topics in the Natural Gas system Planning that we're all currently dealing with as we think through a variety of policy goals. From the electricity side, you have the SB 100. From the building side, you have the 30 to 32 goals. You know, similarly on the transportation side, we have the Executive Order that's steering us towards electrification of light duty vehicles as well as decarbonization of the broader fleet. And you have a variety of other goals that are all coming together that really need a situational awareness of where we are.

And the second element to what Commissioner McAllister already pointed out is the importance of CEC's role in ensuring that this Policy Ideation and Preliminary Planning Phase has a robust analytical underpinning. And as a part of this year's IEPR, CEC will begin to build on its existing analytical work and refine and develop additional critical analytical products necessary for the ongoing planning that we're kind of going into.

As a complement to the IEPR work this year, the staff have been doing incredible work in trying to develop necessary relationships to build together a coalition and a broad coordination of stakeholders to ensure the discussion is robust. So outside of this public process of the IEPR, the staff has also created and established a Gas Working Group, which informally meets. Has about 80 different stakeholders that are participating really with the goal of achieving a statewide perspective and engender a robust discussion. So I'm very thankful and grateful to the CEC staff for envisioning that and including the State policymakers, utilities, and a variety of other stakeholders, bringing them to the table on a regular basis to continue fostering this conversation both in a more formal setting, but also informal setting.

So in closing, as we go into this IEPR, I just want to remind everybody who joined us today the enormity of the situation we're in. As Governor Newsom has multiple times noted, California is really in the middle of a climate emergency. And to complement and to address that, you know, we have a number of ambitious goals that I kind of mentioned earlier. So as we think through these ambitious goals, the importance of decarbonizing the energy system by 2045 is an absolutely important and pivotal opportunity we have to solve this climate issue. And so as we do this, we need to do it in a clean, affordable, and reliable fashion. And so -- and in order to achieve that, it really requires a lot of conversations with our sister agencies, stakeholders and the public at large to ensure that we have those diverse perspectives coming together and we take an educated and deliberate decisions as we move forward. So I'm really looking forward to the discussion today, and I'm really grateful and thankful to all the staff for the time that they put in to make this happen today. Then I will pass it back to Heather.

MS. RAITT: Great. Thank you, Commissioner. So I'll go ahead and introduce our first presenter this morning. It is Melissa Jones. She's a senior energy policy specialist with the Energy Commission's Energy Assessments Division. So Melissa is going to give us an overview to help set the stage for the workshop today. Go ahead, Melissa.

MS. JONES: Good morning, everyone. Good morning, Commissioners. Welcome today. I'd like to thank all the participants in today's workshop as well, in advance, and welcome all the stakeholders. Next slide, please.

As the Commissioners pointed out, we are kicking off the Gas Track of the 2021 IEPR with this workshop. And as mentioned, we have two -- the two areas of focus and the scoping order. Situational awareness of emerging topics in natural gases and planning, and then refining and developing critical analytical tools and products necessary for gas planning. Today's workshop is going to focus on Gas Infrastructure topics. We'll hear about hydraulic modeling of the gas system and presentations on gas systems R&D.

The Warren-Alquist Act requires us to analyze all aspects of natural gas, including forecasting and assessment of demand, supply, price, infrastructure, markets and all related topics. In addition, we are asked to identify emerging issues in this area. The intent of this work under the Warren-Alquist Act is to provide an analytical foundation for policy development for the State of California. You can anticipate future workshops in the IEPR on gas issues. We will be having a workshop addressing gas demand, gas price and rate forecasts. We will also be discussing the long-term demand scenarios. We will have discussion on electricity reliability, but we'll also be addressing gas reliability and the inter-connection between these two systems. And then we will also be addressing renewable gas and hydrogen as part of this process. So gas issues haven't been a major focus in our IEPRs over last few years. Electricity issues are typically front and center. But what we want to do this year is start familiarizing our IEPR stakeholders with the gas system, gas issues, and the gas analytics that we're addressing. We believe a coordinated approach with key stakeholders, local government, communities, and state agencies is essential. Next slide, please.

So there are a number of critical issues that are driving the need for effective planning on the gas side. We have gas issues that are rapidly evolving, and the State really is at an inflection point. We have building electrification likely to reduce long-term demand for gas over the next few decades. We think that decarbonization is going to present new challenges for gas system planning. There are these critical interdependencies between natural gas and electricity systems that call for more coordination. We also have the emergence of low carbon alternatives, including renewable gas, hydrogen, and engineered carbon recovery or removal.

Also front and center are energy equity concerns and the need to limit stranded cost as we move forward. All of these issues are part of the transition away from fossil gas, and it really does require a more proactive approach to planning and a, both a rigorous and transparent process for that.

Unlike the electricity system, there isn't any formal gas planning process. The utilities do long-term forecasting of demand as part of the California Gas Report, and they are now doing that as well as part of the IEPR. However, infrastructure investment and other decisions about natural gas are based on shorter term timeframe, typically three to five years in the context of rate cases and other CPUC regulatory proceedings. There are only a limited set of parties who consistently participate in these cases, and issues tend to be very technical. For some of these stakeholders it's difficult to effectively engage. Next slide, please.

So before I start talking about gas analytics, what I’d first like to do is run through a set of slides to orient those not as familiar with Natural Gas Data Trends and Analysis. This will be critical foundation for energy decision making in the State.

So California is the second largest gas consumer in the US behind Texas. California's average gas use is about 5.5 billion cubic feet per day, Bcf. At the peak, it can increase up to 11 Bcf on a very cold day. The gas system is generally designed to serve residential peak load on a cold winter day, and the cost allocation for the system follows the same design or use. While gas prices are set in an unregulated, competitive market, FERC does have transmission -- does have authority over transmission rates. Gas utilities are, in the State, are common carriers. They purchase and deliver gas to core customers, who are residential and small commercial, but they transport only for noncore customers. They don't sell gas to these customers. These include electric generators, large commercial and industrial, including refineries. The gas utilities also have an obligation to hook up customers if they request it and need to get permission to abandon service. Next slide, please.

So most of California's gas supplies come from over a thousand miles away. Out-of-state gas supplies account for approximately 90% of our total gas supply. And of that 90%, about 20% comes from Alberta, Canada via the Gas Transmission Northwest Pipeline, 30% coming from Southern Wyoming via the Ruby Pipeline and also the Kern River Pipeline. About 40% comes from the San Juan Basin in Northwest New Mexico. That comes into the state via the El Paso Natural Gas and Transwestern Pipeline. And then finally, 10% comes from the Permian Basin in West Texas and Southeast New Mexico, again through El Paso Natural Gas and Transwestern Pipeline. PG&E generally is more reliant on Canadian gas, while SoCalGas relies more on Rockies and San

Juan gas. In-state supplies are about 10% of total supply. Next slide, please.

Gas production in California has been declining since the 1980s, as you can see on the graph here. Gas is -- the gas production in California is less than 1% of the total U.S. gas reserves and production. The fields are located primarily in geologic basins in Northern California, excuse me, Northern Central Valley, some in the Central, Southern Central Valley, in the Northern California Coastal area, and offshore in the Southern Coast area. Gas production has gradually declined, and we expect it to continue to decline.

The primary reason for this is that oil and gas producers aren't extending their drilling dollars in California because they can drill elsewhere at lower costs. California's natural gas production, with less than about one tenth of the State's demand in 2019. Production in Northern California is primarily dry gas, while in Southern California, it's wet gas. When gas is retrieved or produced, it can be considered either wet or dry. Dry gas is at least 85% methane. Wet natural gas typically comes in association with oil production, and while it contains methane, it also contains liquid such as ethane, propane, butane and others. The more methane natural gas contains, the dryer it is. Next slide, please.

So California has an extensive system of gas storage and pipeline infrastructure. California gas -- the utilities have significant storage due to the unique geology in California. Storage is an important part of the gas utility system, so reliability standards for the gas system are based on a combination of pipeline capacity plus storage, injection, and withdrawal. The storage fields for PG&E, which are shown in yellow, they're yellow squares. PG&E has the Los Medanos, the McDonald Island, and Pleasant Creek Storage Facility. The SoCalGas, shown in the triangles, has Aliso Canyon, Honor Rancho, La Goleta, and the Playa Del Rey Storage Field. In addition, we have independent storage providers, and they are shown in the yellow circles, and they include Wild Goose, Lodi Gas, Gill Ranch, and Central Valley Storage. Together these fields have a natural gas storage capacity of about 600 billion cubic feet.

COMMISSIONER GUNDA: Melissa.

MS. JONES: Pardon me?

COMMISSIONER GUNDA: This is Siva, just calling. I think we had one slide behind, so just requesting that we move forward a slide.

MS. JONES: Oh, I'm sorry. Apologies.

All right, so let me just recap. PG&E are the -- are the red squares, the Independent Source producers are the yellow squares, and the blue triangles are SoCalGas. So in addition to the storage, California has an extensive pipeline gas system. PG&E has a service territory that expands, or it spans 70,000 square miles of service territory. Their natural gas systems include about 50,000 miles of natural gas pipeline. SoCalGas's service territory encompasses approximately 24,000 square miles in Southern and Central California. SoCalGas owns and operates about 3,500 miles of transportation pipeline, while they have about 50,000 thousand miles of distribution pipeline. Next slide, please.

In terms of gas demand, you can see from the slide here that early, let's see here, excuse me, that overall gas demand started to decline, well, it went up from 2010 and 2011, and that was some of the rebound that was associated with the Great Depression. But following that, we've seen declines in natural gas in demand. Weather is the most important variance in terms of gas demand. You'll see that gas demand went up in 2012, 2013, that in that year we experienced a particularly cold winter. Residential varied mostly with weather, but also economic conditions affect that. Electric generation varied depending on the weather, but also the hydro condition in the State and in surrounding states where we import hydropower. We -- gas demand does increase as a clean fuel to make up for lost hydro, and it decreases substantially when we have wet hydro conditions.

Overall gas generation is declining with the increase of solar and wind generation on the electric system, which has increased dramatically in recent years. We expect that gas demand overall in the electric sector is going to decline. However, in the near-term we may have some additional growth simply because of renewable integration needs, in the near-term. Both utilities have forecasting declines in residential gas need, and in the commercial sector. Most of these savings are attributed to energy efficiency. However, I will point out at this point in time, their forecasts do not take into account fuel substitution or electrification of residential and commercial buildings. Next slide, please.

So gas prices were quite low and stable from the mid-80s to 2000, but we saw a peak in gas demand that started around 2010. You will also notice that there is a spike in demand in 2000 and 2001. That is associated with the California Energy Crisis. And starting in around 2004, we were starting to see declining production in our traditional gas basins and competition for that gas started driving up the prices. At that point in time there was an extensive building of LNG facilities in the US, but primarily in the Gulf Coast and East Coast. There were as many as five LNG facilities proposed off the California Coast, and Cost Azul LNG facility owned by Sempra did get constructed. It's in Mexico.

And then in around, well, so we then had shale gas -- gas production that started to replace the need for LNG. Starting in about 2000, shale gas provided about 1% of U.S. natural gas production. By 2010, it was up to over 20%. And the EIA anticipates that by 2040 -- 2035, as much as 46% will be from shale gas. U.S. -- the U.S. is now a next -- net exporter of gas for about the last five years and in addition, there is at the Costa Azul Plant, which was originally designed to accept LNG imports, they are adding the capability to export from that terminal. And as you can also see from this Price Graph, California's at, weighted average Citygate Prices tend to trend slightly lower than U.S. prices. Next slide, please.

So now I'm going to just introduce some of the analytical capabilities, modeling expertise, new tools and models that are needed to support gas transition planning. We believe that -- we have been, over the last year, reevaluating our gas analytics. We believe that broader more comprehensive assessment of natural gas are needed to support important policy objectives. These include ensuring reliability for remaining gas customers and also ensuring reliability for the electricity system.

In addition, we want to minimize ratepayer impact and the burdens that are placed on remaining customers, and above all, we want to provide for environmental sustainability. We believe that analytical support for strategic planning will enable us to come up with better clean energy policies. And in order to do that, we need to understand changing demand patterns and long-term demand scenarios. We need to identify additional opportunities to downsize gas infrastructure. We need to assess how to adapt gas system reliability standards over time. And we also need to develop ways to deal with financial implication of gas system costs as they're spread over fewer customers. Next slide, please.

So this slide shows the Gas System Modeling and Analytics that we're engaged in. And as you can see, it's very interactive -- iterative, and there are many flows of information back and forth between the different models, and tools, and analysis that we do. So on the right hand side of the figure, we show Gas Demand Forecast as part of our California Energy Demand Forecast. We use various end-use and econometric models to forecast gas demand and we use economic -- econometrics and we use demographic inputs in identifying forecasts. We use gas price inputs. We use electricity price inputs. And finally, our policy goals are incorporated into our Demand Forecast. The outputs of these models is Gas Demand by sector, and I will point out that this, the CEC only accounts for Residential and Commercial, Industrial and Other Demand. We forecast Electric Generation Demand separately. And so in the second column, what you see at the top is our forecasting of Electric Generation Demand and we do use Production Cost Modeling, our PLEXOS Model, to arrive at Electric Generation Gas Demand for the State.

Next, we do Gas Price Forecasting. We use our NamGas Model, which produces annual and monthly gas commodity prices, and those are Trading Hub Prices. We also develop Burner-tip Prices, which are basically Hub Prices, plus the cost of transportation. We forecast Gas Rates and we try to incorporate Market Dynamics into those forecasts.

Next, we do Infrastructure Assessment, and we use both gas balance and hydraulic modeling to address infrastructure. And today we will be hearing about our hydraulic modeling. The issues and things that we can address with these two tools are reliability of the gas system, operations, safety, and asset replacement, amongst a number of other infrastructure questions that are put before us. There's also Policy Assessments that need to be done as we move forward. In some cases, we're developing new tools. We will all need to develop some new tools and models to address many of these issues. And some of them include GHG emissions, equity and workforce, the role of the gas system in our overall decarbonized energy systems, and where our energy and hydrogen will fit in.

And then finally, that brings us to, on the right hand side, Long Term Infrastructure Planning. And for this, we have some tools already. We're developing tools. You'll hear about some of those today. The utilities are developing tools as well. And these tools and models will help us prioritize safety investment. There's a large amount of investment that are still scheduled to be done regarding safety. And so we need to decide how to prioritize those investments and limit our stranded cost. We need to start targeting electrification so that we can get the best results in terms of cost savings on the distribution system. We need to look at ratepayer impacts. We need to identify alternative rate design. We need to look -- need to look at distribution decommissioning. We have aging infrastructure and AldylA Pipeline that needs to be replaced. We need to look at Utility Business Model, and in all of this, we're trying to reduce the amount of stranded assets.

And so, as you can see, we have a lot on our plate and we're very excited to be doing this work. And so if there are any questions, next slide, please. I will be happy to take them.

MS. RAITT: Okay. Thank you, Melissa.

MS. JONES: Thanks.

MS. RAITT: Hearing no questions. You did a great job.

So I would like to introduce our next speaker. I'm Heather Raitt. Our next speaker is Jason Orta. And Jason is also with the Energy Commission's Energy Assessment Division, and he's the Lead Natural Gas system Hydraulic Modeler. Go ahead, Jason.

MR. ORTA: Good morning, Commissioners. So this presentation will discuss one of those tools and skill sets we are developing for the Analysis of the Natural Gas System, which is the -- which is the hydraulic modeling, the analysis of the gas utilities' hydraulic models. These models will provide valuable insight to California's natural gas system. In addition, this presentation will explain what hydraulic models are, how they are used by utilities and how they can support the CEC's work in analyzing the natural gas system.

The Warren-Alquist Act requires the Energy Commission to conduct forecasts and assessments of the natural gas system. These analysis -- analyses are to consider reliability, environmental impacts, California's economy, and public health. For the 2021 IEPR, we are assessing the long term outlook for natural gas use, while developing and refining tools such as the hydraulic modeling. Next slide, please.

In California, natural gas is used for water and space heating, by restaurants, schools, commercial laundries, health care, food processing, and as a fuel and an input for industry. The images that you see on this slide are not an all-inclusive list of natural gas users, but it gives you an idea of the diversity of users and their different uses and their different needs. But also of interest here is the role of natural gas-fired power plants in meeting electricity demand and also supporting the integration of renewables in the electricity system. So natural gas system reliability impacts electric system reliability, and the needs of the electric system impact the gas system as well. Next slide, please.

So Melissa showed you in her presentation those the resources where California gets its natural gas from. I just showed you a slide that provides an example of the diversity of the demand of natural gas. The system -- the transmission system that you see on the right hand of this slide is a system where all that gas from out-of-state and in-state is delivered to customers. Also seen on this slide are the storage facilities that are interconnected to California gas system -- to the California gas system. The gas system in California looks like this in order to deliver gas to where it's needed and to bring it from where it's produced. So the gas system will look completely different if population and if demand were in different locations.

One of the things that I didn't -- I forgot to bring up in my previous slide is speaking of demand. We also -- the complexity of the gas system also extends to the transportation system as natural gas is used for oil refining and also the infrastructure can be used for compressed natural gas or renewable natural gas transportation fueling. But so if you take the complexity of dispersed demand in the supply of this system, in the supply, hydraulic modeling can give you an insight into that complex system. And this is just a part of the system because the graphic that you see on the right does not include the gas distribution system. Next slide, please.

So what is hydraulic modeling? The images on the left are stock photos from the training materials for the hydraulic modeling software. Those aren't the hydraulic models that are provided to us. Hydraulic modeling is the gas equivalent of the power flow model. And it answers -- and it's basically there to answer the question of can we ensure that the gas system meet demand while avoiding customer curtailment?

So hydraulic modeling works as follows, it simulates the activities of the gas system in order to assess pressures and flows. And you're all -- and also it's the other -- the other thing here is that you have to meet demand while falling into -- falling in between minimum and maximum allowable operating pressures. These models can not only explore a moment in time, but they can also explore a period of time, a whole day for example, in a gas system within minutes or an hour by hour look at what's happening. I've been asked why spreadsheets cannot be used to simulate the system. Well, these systems are very complex. There's multiple supply and demand nodes scattered throughout the system, and the networks include pipes with different diameters and lengths. Next slide, please.

So what's in these hydraulic modeling files that are transmitted to us by the gas utilities? These include things like system specifications, such as pipeline lengths and diameters. Also, there are other system components represented in these models, such as valves, compressors and regulator stations. It also -- they also include supply and demand throughout the system. But please note, as you can imagine that this data is very sensitive, and CEC regulations allow for automatic confidential designation for the models provided to us. Next slide, please.

The hydraulic models are read on a software platform known as Synergi Gas, which is used by most large natural gas utilities in the United States. This software was developed in the 1970s. And after several acquisitions, Synergi Gas is now a -- the product of the DNV company, which is based in Oslo, Norway. Next slide, please.

How did gas utilities use hydraulic modeling? Here's a -- here’s a quick overview. This is not an all-inclusive list. These models are used to assess -- to calculate available capacity on the system. Say for example, you -- they are doing work on a compressor station. If that compressor station is not available, tomorrow, based on that information, they'll calculate tomorrow's available capacity. Hydraulic models can also be used as a planning tool. For instance, you -- a system, a gas system might have an expected future change in demand, such as a new housing subdivision or a new power plant, or if a gas system is -- if there's a proposal to add or remove infrastructure off of the system, hydraulic models can assess the impacts of those future planning activities. Next slide, please.

The CEC’s hydraulic modeling work has been developed over the last five years. So in April 2016, when

SoCalGas released its modelling results for the Aliso Canyon study, the State agencies relied on these utility results. However, the State was not able to have -- was not able to independently verify those results at that time. So over the years, we have -- we have adjusted to that circumstance. So in February 2018, we modified our data collection regulations to require large gas utilities to submit hydraulic models. We are the first state, the first regular -- state regulatory agency in the United States to procure a Synergi Gas license. And right after we changed our regulations, we received training from DNV in person and also via webinar. And in addition to that, the gas utilities have submitted hydraulic models, provided us demonstrations of their models, and have responded to our various data requests. And in addition to that, we have spent a lot of time looking at these models and trying out different things with them. Next slide, please.

So this -- the work with the utilities alludes to our approach to hydraulic modeling. It's a collaborative activity with the utilities who operate these systems and who have built and modify these models over many years. This includes collaboration with colleagues who work on electricity and natural gas issues because the gas system and the electricity system are very much interdependent. There's also a bit of research involved keeping up with regulatory proceedings related to natural gas. Understanding the models and the software is not enough. The context that is provided in these proceedings completes the knowledge that you need for this. Next slide, please.

So I'm going to go quickly through some observations that I've had from looking at the gas utilities models. We see where the gas comes in and where it's delivered. We can also make adjustments to that by setting pressures, setting pressures on compressor and regulator systems. You can also observe the complexity of this system. As we look at the future of the natural gas system, you may see something -- you might see a pipeline in a system in which it flows to a lot of residential customers and it -- and it ends in a large customer. Next slide, please.

You'll also see deliveries between the utility systems, you know because the systems of PG&E and SoCalGas are interconnected. You can identify spots that are vulnerable to high and low pressures on the system. And in -- and in -- and we also are able to assess the impact of hypothetical service curtailments, including simulating what happens if gas is not delivered to a power plant. And we were also to look at scenarios such as the impact of disabling pipeline segments and other components of the system, including compressor engines, and we were able to look at bringing in alternative supplies or supplies from other supply nodes in the model to meet system demand. Next slide, please.

So we are -- we are continuing to build upon this work in the future. We want to further understand the interdependence between the gas and electricity systems. We also want to do a deeper dive into local transmission and distribution models and better understand flows to residential customers. Hydraulic modeling can also be used to simulate hydrogen blending into the natural gas system. Hydrogen gas is a different chemical property, has different chemical properties than natural gas. More molecules of hydrogen are needed to produce equivalent amounts of energies. We don't have that capability yet, but we are working with a software vendor to develop that. We also want to continue collaboration on gas R&D efforts. And one of the things that Melissa mentioned in your presentation is further refinement of demand forecasts and doing deeper dives on those. We want to be able to incorporate different demand scenarios into the hydraulic modeling. Next slide, please.

And that concludes my presentation. Here is a lovely photo of me at an RNG production facility near Bakersfield. Commissioner McAllister and his adviser, Fritz Foo, was also on that trip. That was a -- that was a fun day. And I will take any questions. Thank you.

I see that Commissioner Monahan has a question for me.

COMMISSIONER MONAHAN: Yeah. Jason, that was great. Just a really quick question. The slide when you showed the deeper dive into local transmission and distribution models and you pointed out residential, can we also do that same kind of refinement with industrial sources? I think it’s -- is it --

MR. ORTA: Yes.

COMMISSIONER MONAHAN: Okay. So it's not just one or the other, we can actually tweak the entire system?

MR. ORTA: That's correct. Yes. So on, for instance, on -- you might see on these lower pressure system models, individual or blocks of industrial customers, and we can try different things with demand for those customers.

COMMISSIONER MONAHAN: So we -- so we could do -- we could try what would it mean to blend hydrogen, and have it be really targeted to specific industrial users?

MR. ORTA: We -- that's something that the model can, I mean, we can eventually do. I don't have the capability to do hydrogen blending yet, but the software vendor has expressed a lot of interest in spending time with me to do that and that's something that we can -- that I can look into.

COMMISSIONER MONAHAN: All right. Thank you.

MR. ORTA: Thank you.

COMMISSIONER GUNDA: Thank you, Jason. Just a couple of follow-up questions, and I'm seeing the Q&A too, and I think they are consistent with a couple of questions.

So do, first of all, thank you for the excellent presentation. That was very helpful to set the stage. So as we think through this, you know you kind of specifically mentioned the interaction of storage and the reliability, and the ability to use the hydraulic modeling to support that work. Could you expand on that a little bit? What we're considering in the short timeline and also the longer timeline, what you're thinking about and anything that you could share there?

MR. ORTA: Yeah. So in terms of -- in terms of looking at storage, you'd want to try different demand scenarios. And if you can, depending on the model, intraday scenarios, looking at various injections and withdrawals from these facilities. You also might want to look at a lower demand day to see how the impact of maybe injecting into a storage facility would impact system pressure. You might have a scenario where there's flow that pressures might be going up, you might have a lower demand day and you might want to look at injections. So those are the various kinds of scenarios that we would need to flesh out is looking at sort of these intraday injections and withdrawals from storage facilities.

COMMISSIONER GUNDA: Thank you, Jason. So I'm going to, just taking it from what you say, that you know, as we move towards, you know, the kind of cleaning up to the electric grid and the dependency of the natural gas fleet on the infrastructure and the storage and all, we will be able to understand the electric reliability tie up with the infrastructure pretty well with the hydraulic model.

MR. ORTA: Yes. You can definitely -- you can definitely develop that understanding. I mean what you would see, for instance, if you withdraw -- if you do a storage withdrawal on a -- on a model and simulate a day, you can see the pressures at a level in which it would allow for reliable service to those facilities. I mean it's -- or you can look at -- you can look at the storage facility by itself or if there's others interconnected to the system, you can look at how they work together. So there's definitely different types of scenarios you can look at especially, and as power plants are, you know some of them are really large customers, you can see impacts to individual power plants or groups of them within a similar location.

COMMISSIONER GUNDA: Great. Thank you so much.

MR. ORTA: Thank you, Commissioner.

COMMISSIONER MCALLISTER: Okay. I see we do need to move on because we're a little bit over time. So I will -- thank you, Jason, for that. I will -- I'll hold my questions until a little bit further on.

MS. RAITT: Okay. Thank you, Commissioners. Thank you, Jason. So we'll move onto our next speakers.

Kristina Abadjian and Eileen Hlavka are joining, both from the California Public Utilities Commission, and Eileen and Kristina are both senior energy analysts at the CPUC. Go ahead. Thank you both.

MS. ABADJIAN: Good morning, everyone. My name is Kristina. First, I'd like to thank the Commissioners and Energy Commission staff for inviting us to present on some of the developments in the CPUC's Aliso Canyon investigation. Next slide, please.

Before we dive into the analytics of this proceeding, I'd like to briefly go over this graphic with you, which is a map of where gas storage fields are located in California. As you can see at the bottom, Aliso Canyon is located in Southern California near Los Angeles and is the largest of SoCalGas's four storage fields. Next slide, please.

Here we provide a brief overview of Phase 2 of the proceeding. The CPUC opened this investigation in 2017 to determine whether we can move away from Aliso while still maintaining gas and electric reliability and just and reasonable rates. The modeling inputs in Phase 2 incorporate all of California's current climate goals and assumptions about future electric procurement in the CPUC's Integrated Resources Plan. The modeling results show that we cannot yet eliminate Aliso without risking energy reliability and customer rates given the rules and infrastructure we have in place today. The Phase 2 results will inform the CPUC's Phase 2 Decision, which has not yet been determined. Next slide, please.

This slide provides a breakdown of our modeling efforts and results. The economic modeling was backward looking. We tried to assess the economic impacts of the restrictions at Aliso. The modeling also captured the impacts of outages that we saw on critical transmission lines starting in the fall of 2017. Here we -- here we conducted a Volatility Analysis which showed that gas prices became more volatile in 2017 and more so in 2018. The Difference in Differences Study in which we estimated the economic impact of the Aliso restrictions on core customers showed that procurement costs for core customers went up in 2017 and even more so in 2018. The total impact on SoCalGas's core customers averaged over $100 million per year from 2016 through 2018. The Implied Market Heat Rate and Excess Electric Cost Study estimated the efficiency of the electric markets before and after the Aliso leak, and it assessed excess electric costs caused by the Aliso Canyon restrictions. This study showed us that customers paid about $916 million in excess electric costs in 2018.

So the Production Cost Modeling and the hydraulic modeling were more forward looking. We tried to see what the impacts would be if we actually minimized or eliminated Aliso altogether. The Production Cost Modeling assessed whether eliminating Aliso would cause reliability impacts on electric markets. The PCM compared to scenarios, an unconstrained scenario where the system is operating without constraints on available gas. The second scenario assumed a minimum local generation scenario which -- where we curtailed generators down to a Minimum Local Generation level. The modeling here showed that there would be significant reliability concerns if generators were curtailed to that Minimum Local Generation level. And in addition, electric costs were estimated to increase if generation was curtailed, primarily due to an increased need for power imports.

And finally, the hydraulic modeling was done to determine the ability of our current gas system to provide reliable gas service to customers. The Reliability Assessment of the hydraulic modeling focused on whether demand could be met under different peak day standards. The modeling showed that summer peak demand could be met in all study years without the need for Aliso Canyon. In addition, it showed that Aliso is not needed to meet reliability under 1-in-35 winter extreme peak day conditions. Now under this scenario, noncore customers are assumed to be fully curtailed. However, under the 1-in-10 winter peak demand conditions in which SoCalGas is to maintain service to both core and noncore customers, the modeling showed us that Aliso is needed for reliability in all the study years.

Next, the Feasibility Assessment focused on whether demand could be met across multiple cold days under a range of conditions, including differing levels of available pipeline capacity. The Feasibility Analysis showed that pipeline capacity available was the strongest determining factor affecting the feasibility outcomes. The Feasibility Assessment results suggest three potential maximum allowable Aliso inventory levels, depending on the level of pipeline capacity assumed to be available, and the CPUC's determination of acceptable risk of gas shortages. And you see right here the three different maximum allowable inventory levels that were suggested through the -- through the Feasibility Assessment.

So that's the update I have on Phase 2. Next up, I will turn it over to my colleague Eileen, who will go over Phase 3.

MS. HLAVKA: Thank you, Kristina. So while Phase 2 studied the situation with the current infrastructure, Phase 3 looks at the potential to replace Aliso Canyon with alternatives as early as 2027. This Phase of research is -- was contracted out to FTI, Inc per the governor's request to hire an outside contractor. FTI's research approach has two main phases; the baseline and portfolios.

The baseline is modeling how much gas demand could not be met on the coldest day in 10 years if Aliso were gone. And this was done using hydraulic modeling with the Greg software, which is similar to the Synergi software which Jason discussed and which CPUC's team used for the Phase two research, which Cristina discussed.

Then the portfolios. So if that demand shortfall was filled with something else, then for each of several something elses, what are the costs and the benefits, that is to ratepayers, modeled by iterating market models for 20 years? For this, the gas production cost model was used for the gas market modeling and PLEXOS for electricity market modeling. Sorry, I said was. This is ongoing. The demand assumptions FTI is using for this are from the utilities 2020 California Gas Report. These results will be presented later this summer and fall. For some results so far, let's go to the next slide.

In addition to the modeling with the gas production cost model and PLEXOS, FTI also did a monthly gas balance, which tracks gas supply storage and demand on a monthly basis over the course of a year to see if demand can be met.

This was for 2027 and for 2035. This analysis concluded that seasonal demand can be met without Aliso, which is in part because demand is forecast to decrease by 2027 and further by 2035. However, their Baseline Analysis baseline, in the sense that I discussed earlier, concluded that in the absence of Aliso Canyon or something to replace it, there would be a gas shortfall on a 1-in-10 cold winter day. Next slide.

That shortfall is shown on this slide as the so-called target. What we're looking at now and what FTI is researching is what portfolios can fill that. So from left to right on the slide: with that being upgrades to the existing gas system, which are kind of a business as usual approach, which can be compared with the others; reductions in gas demand. That is potentially including energy efficiency, building electrification, and/or gas side demand response; increased electric generation resources, which would be in proportion, modeled in proportion to what's in the IRP, thus including solar storage and electricity side demand response; or additional electric transmission; and a fifth portfolio, which is to be defined after we have results from the first four, potentially combining their strongest options. All of these results and portfolio definitions are preliminary, and upcoming workshops will also be open for formal comments. Thank you. And I will turn it back over to Heather.

MS. RAITT: Great. I think it looks like Commissioner McAllister. Do you have a question? Oh. It looks like you’re muted or we're not hearing you.

COMMISSIONER GUNDA: We do see your video now.

COMMISSIONER MCALLISTER: Should be working now. Can you hear me?

MS. RAITT: Yes.

COMMISSIONER MCALLISTER: Great. Okay. Yeah. Sorry about that. So I had my hand up from the last presentation, so no. No questions for the PUC for now, but thanks a lot for the presentation. It's really great to know that you're digging into Aliso. And I'm sure there's, you know, a lot of depth that we could go into. We don't really have time to about the contractors work and, you know, providing some additional context, but thanks for that update.

COMMISSIONER GUNDA: Yeah. I do want to just kind of make sure I say the same thing, I think. Kristina and Eileen, thank you so much for your presentations and also the ongoing collaborative work that CPUC and CEC have been doing together to really kind of foster a robust conversation on developments. That's really good to hear. I have a bunch of follow-up questions that I'll follow-up separately. I don't think we'll be able to hear them today. Thank you so much.

MS. ABADJUA: Thank you.

MS. RAITT: All right.

MS. HLAVKA: Thank you.

MS. RAITT: Thank you so much. So we will move on to Jonah Steinbuck from -- he's a manager at the Energy Commission's Energy Generation Research Office. So go ahead, Jonah. Thank you.

MR. STEINBUCK: All right. Thanks, Heather. Good morning, everyone. Good morning, Commissioners. Again, I'm Jonah Steinbuck. I'm the manager for the Energy Generation Research Office at the CEC. And thanks to the IEPR team for the opportunity to share our R&D work here today relative to gas infrastructure and specifically focused on targeted decommissioning. I do want to say, too, that this work has benefited from stakeholder input in past workshops and wanted to also just thank our colleagues at the CPUC and the IOUs in particular for productive conversations and information exchange that helped contribute to this work. And very much welcome, you know, further input today to help further shape this work and make it more impactful. Next slide, please.

So first, I'd like to just provide a little bit of context on the Natural Gas R&D Program, which is this work that I'll be discussing today, is situated within. Then briefly discuss a Study of Gas system Transition that informs our decommissioning related R&D, and then cover some specific plans on R&D initiatives focused on Targeted Decommissioning. Next slide, please.

So I will start with the program overview for some context. Next slide. So the Natural Gas R&D program advances research and technology development that supports the State's goals for decarbonization, safety and equity. It operates on $24 million per year of natural gas ratepayer funds and then delivers grants to researchers and technology innovators. And the Project's been a broad range of areas. The various sectors that consume natural gas shown in the pie chart here, as well as safety of transmission, distribution and storage, and renewable gas production as well.

And these R&D investments have had significant impact. One measure of that is the sort of amplifying effect of our investments. So over the past decade and a half, the CEC has supported 270 projects, investing $278 million of public funds, which then catalyze $4.4 billion in follow-on private investment. So a 16-fold, kind of amplifying effect on our public investment there.

And then with respect to equity, over the past five years the CEC has invested two-thirds of its Natural Gas R&D Program funds on projects in disadvantaged and low income communities. And those are -- some of those project sites are shown as various colorful symbols here on the map to the right. Next slide, please.

So I'd just like to give a little bit of a sense of the breadth of the Natural Gas R&D Program. This is an illustrative subset of initiatives from the last two Budget Plan Cycles. So you can see a range of initiatives. We've got renewable gas production research, hydrogen applications in trucks and buses. And for power generation, studies have pollutant exposure from cooking with natural gas, among others. And the two that I'll be focusing on here are shown in bolded text. So the data driven tool for strategic and equitable decommissioning and the location specific analysis of decommissioning. Next slide, please.

So I'll just briefly touch on a study, first, that informs some of the current R&D initiatives that I'll be discussing later in the presentation. So you can go the next slide, please.

So this is a project led by E3 that concluded last spring and really helped crystallize the need for managed gas system transition. So the overall objective was to inform decision makers on how the gas system and building sector can help meet our mid-century greenhouse gas goals, while also addressing considerations of affordability and equity. So the main takeaways are on the slide here. Building electrification is a key, low cost, low risk strategy for meeting our climate goals relative to scenarios with greater reliance on renewable gas use in the building sector. By pursuing a high electrification pathway within buildings, you can drive down emissions within the building sector, and that can put us on a path for reaching the economy-wide carbon neutrality goal.

Renewable gas, while relatively costly, is still quite important for decarbonization, particularly in hard-to-electrify cases. So segments of the industrial sector and trucking, as a couple of examples. And the study also introduces and discusses this feedback loop that could push up gas rates for customers that remain on the gas system due to drivers such as aging gas infrastructure and economic electrification. That feedback loop in the overall study really underscore the need for a managed transition to both achieve our climate goals but do it with low societal and customer cost and also with attention to equity. Next slide, please.

So that's a closer look at the feedback loop I just mentioned. So top left we've got aging gas infrastructure and rising commodity costs that contribute to higher gas rates. That together with lower cost renewables, better electric technology like heat pumps and reduce -- increase electric demands, all drive towards building electrification and being more economic. That together with climate policies, then reduces gas demand. And so the fixed costs of maintaining the natural gas infrastructure is spread across fewer customers and fewer, you know, less throughput. So that puts upward pressure on gas rates. So this again underscores the need for a managed transition and motivates some of the other R&D that I'll discuss next here. Next slide, please.

So yeah, just will provide a little bit of a brief overview of two R&D initiatives related to decommissioning. Next slide, please.

So the first initiative is focused on developing a data driven tool for identifying promising decommissioning sites. So the focus would be on the distribution portion of the gas system, which links to buildings. So the idea would be to evaluate kind of broader regions. Sorry. Previous slide. With the graphic. Back two slides, please. One more. Yep. Oh. There we go. The one with the buildings schematic, please. Thank you. That's it. Okay.

So the funding level for this initiative is 1.5 million. We plan to have a workshop in the summer time-frame, with research solicitation to follow thereafter. And we envision a series of follow-on initiatives to build on this effort. And the figure to the right here, this shows a sort of simplified schematic that illustrates that if we take a zonal or geographically clustered approach to electrification, we can then retire segments of the gas infrastructure, realize the cost savings from no longer maintaining that infrastructure, and that helps address the feedback loop on gas rates that I mentioned before.

This initiative will leverage detailed information from the IOUs about the gas system infrastructure, as well as the co-located electricity system infrastructure to understand where may be favorable to decommission. So this would incorporate information on, for example, the condition of natural gas pipelines, the cost of maintaining that infrastructure, etc. And some of this information will be leveraged from early pilots, including to under the natural gas R&D program that my colleague, Qing Tian, will be discussing a bit more in the next presentation. But the initiative here is really going to help evaluate opportunities for decommissioning and then help address, you know, examination of potential benefits of decommissioning. And the tool could be used to explore how different site selection criteria may suggest different locations or alter the scale of the opportunity for decommissioning, so it can be a tool to aid in our thinking. Next slide, please.

So here's a look at the benefits, the initiative is intended to support state agencies to more effectively engage in policy and planning for the gas system. One goal is to foster an open accessible planning process, and this initiative could contribute to that. Also, it's expected that this tool could enable more focused site-specific analysis of decommissioning and the associated benefits. And then ultimately inform strategies for cost-effective, equitable transition of the gas system. And I'll just note, too, that we've benefited from and appreciate the engagement of the IOUs, and their continued sharing of expertise, information, and data is going to continue to be critical. Next slide.

So this next initiative is in our Proposed Budget for the next fiscal year. This would build on the data-driven tool and develop the analytical approach to examine the technical feasibility of decommissioning specific segments of the gas system. So the first step would be to develop an approach for targeted analysis of the operational implications of decommissioning. What does decommissioning mean for the delivery of gas in adjacent, hydraulically connected portions of the system? And what issues and mitigation measures may be important? And this could include application of tools like hydraulic modeling that Jason discussed, and other engineering analysis tools, as well as consideration of cost of any operational issues. We’d then apply that analytical approach to promising candidate sites, such as those identified from the data-driven site screening tool. Perhaps locations with pipeline integrity issues or other, you know, corrosion, for example. And also examine sites in under-resourced communities to help those communities engage as early participants in this transition. Next slide.

So here's a look at the benefits. It's -- this initiative is intended to support reliability and market stability, help ensure that we're targeting decommissioning opportunities that don't cause other consequences for the gas system operations and help bridge the gap between broadscale system planning and kind of more local system operations. So inform the geographic focus and staging of decommissioning. And then the overall objective is the same as for the data-driven tool to inform strategies for a cost-effective, equitable gas system transition.

And with that I -- my next slide is just the conclusion here. So thank you. And I welcome any questions or comments.

COMMISSIONER GUNDA: Thank you, Jonah, so much for your presentation. That was really, really helpful. Great work there. In interest of time, I would like to move on to the next presentation and maybe you could stay on for questions later.

MR. STEINBUCK: Yeah. Absolutely.

MS. RAITT: Great. Thank you. This is Heather Raitt, again. So our next presenter is Qing Tian and he is the team Lead of the Energy Commission's Energy system Research Office. So go ahead. Thank you.

MR. TIAN: Yes. Thank you for the introduction, Heather. Good morning, everyone, and Commissioners. My name is Qing Tian. I'm from the Energy systems Research Office. Very excited to be part of the IEPR workshop. Jonah has provided us a good overview of our natural gas research and development program. For my presentation, I will be talking about, mostly about, our Natural Gas Infrastructure Safety and Integrity Program, which is part of the R&D Program. Next slide, please.

Shortly after the San Bruno Pipeline incident in 2010, California Energy Commission established our research initiative on Gas, Infrastructure, Safety and Integrity. On average, we have about $6 million dollars to invest every year. So in the last 10 years, we have been focused on addressing safety challenges for both natural gas pipeline and storage facilities. We developed tools and the devices that the utility can use to better monitor the assets and evaluate and to quantify potential risk and develop mitigation measures. As the California approach is decarbonization goals, our Program can take additional responsibility. We also support, you know, a safe and healthy and equitable transition to more renewable and the low-carbon resources. And this include leading edge research on renewable natural gas, green hydrogen, and denitrification, and strategic decommissioning. Today I will first talk about our research on pipeline safety, pipeline and storage safety. And after that, I will walk you through two new research projects on tactical decommissioning. And last but not least, I will -- I will share several upcoming opportunities on hydrogen blending research. Next slide, please.

So for pipeline safety. We developed the sensors and the monitoring devices for damage detection and prevention and improving situational awareness. Through our program and Gas Technology Institute, developed Encroachment Notification Devices. These devices can be mounted on excavator, also provide alerts to utility equipment operators when the excavator is too close to a utility pipeline. So this technology has greatly reduced the excavation damages by providing real-time information about the location and the status of the equipment. Information and Integrity Management is about collecting data and improving asset management for utilities. Through our research program and local view invented a High Accuracy Mapping System to help map out subsurface pipelines and the trace component features. So this technology also enabled for us to data-capture on the display. It also improved workflow and efficiency for utility, for workers.

Risk Assessment is about identify potential threats and hazards and recommend mitigation strategies. As we know, California is a hot zone of earthquake faults that can rupture without warning and leaving our infrastructure vulnerable. UCLA and UC Berkeley are filling the gaps and with Open-source Seismic Risk Assessment Tool. So this tool will model all geotechnical threats to our infrastructure and help identify and prioritize the most impactful retrofits for seismic risk. Next slide, please.

For storage, many of our underground storage wells were constructed before the 1970s, which is more than 50 years ago, and the US standard is now considered inadequate. And the natural gas leakage at Aliso Canyon underscores the need for more advanced monitoring system. And last year we funded two more projects on developing real-time monitoring technologies for storage wells. [Indiscernible] and LBNL are integrating sensors and the monitoring devices at McDonald Island Storage Sites to collect data from a variety of sources. This includes, you know, pressure, temperature, acoustic, and seismic signals. So the system is developed to help utilities meet and exceed to the new regulation wellhead monitoring. Next slide, please.

So several technologies developed from our research program have been adopted by the industry. I will provide a few examples here. So there are more than 700 high accuracy -- high accuracy mapping devices that are deployed to multiple gas utilities in the nation -- in the nation. And the same technology was used to reconstruct communities impacted by Paradise wildfire. These devices helped to accurately map out both pipelines and underground network cables. And the encroachment of notification technology was purchased and commercialized by Hydromax USA, a leader in data solution for inspection of gas, water, and sewer lines. Next slide, please.

During the transition to a clean energy future, one of the issue, we must face, and address is the aging infrastructure. As I mentioned earlier, most of our infrastructure were built more than 50 years ago. A lot of those are close to the service line. So when we are, you know, working on replacing those infrastructures, I think we have to look into the new opportunities and alternatives. And also, there are challenges that is associated with high replacement cost, cost and also the expected decline in demand. Without tactical decommissioning, you can either end up maintaining a much larger system with less customers and the risk with stranded assets and the cost is expected to increase. Those costs will be eventually passed onto our end customers. This has raised concerns on ratepayers impact, and particularly for disadvantaged and low income communities.

So our under-resourced communities are most vulnerable in the -- in the gas transition process. So last year we released one solicitation on Tactical Decommissioning. This solicitation was developed with site selection criteria and with decision making framework for evaluating decommissioning and electrification projects. The project will also work with the utilities and customers and the community outreach partners to electrify on the decommissioned part of our distribution network. And next slide, please.

From that solicitation we, this year, we are expected to award two new projects for Tactical Decommissioning. With the support from PG&E, the E3 team will identify at least three candidate sites in Northern California. This site include communities in Richmond, Oakland, Berkeley, or Tracy. By engaging with community based organization, the project will develop a deep understanding of customer priority in relation to GHG reduction, energy cost, availability, comfort, and health. RAND corporation will work with SoCalGas, evaluate a different decommissioning site in Southern California. The project will use detailed model of our gas system with data on socioeconomic conditions to analyze communities located at Long Beach and Santa Monica. This project will help determine whether the natural gas infrastructure retreat is possible, economically viable, and the customer support it, while maintaining safety, reliability, and affordability of our system. Next slide, please.

A lot is happening around the world in hydrogen research this year, and the CEC will release multiple research solicitations on renewable hydrogen generation and demonstrating hydrogen blending with natural gas through our existing infrastructure and the hydrogen utilization for transportation and our end-use applications. So our program will mostly focus on the delivery of hydrogen and see whether it is possible to blend hydrogen with our natural gas and also or convert the hydrogen infrastructure for -- to deliver 100% clean hydrogen. As we increase the amount of hydrogen blended, this will require upgrades and modifications to our existing infrastructure and to conduct additional testing to ensure system safety as we know hydrogen can cause embrittlement problem and is easy to escape. The research will, we propose, will conduct [indiscernible] test and measure various impact of hydrogen blending and identify system modifications and to maximize blending level. And the research will also help develop implementation strategies and the standards for safe blending. Next slide, please.

Yes. Thank you very much for your attention and I'm ready to answer any questions you may have.

MS. RAITT: Thank you, Qing. Commissioners, if you don't have any questions, or Commissioner McAllister, did you have --

COMMISSIONER MCALLISTER: I just wanted to say -- I wanted to say thank you for a great set of presentations. I had written down a half dozen questions, and you guys answered them systematically in your presentations. So I don't have to ask any additional ones. Thanks.

COMMISSIONER GUNDA: Just echoing Commissioner McAllister, really great presentation. Thank you so much for setting the stage for the comprehensive plan that we have in the R&D. I do have some questions, but in interest of time, I would like to move forward. But I think if you can wait a little bit as time permits, we could come back for discussion.

MR. TIAN: Great. Thank you.

MS. RAITT: Super. So we'll move on to our next speaker, Francois Rongere, and he is joining from the Gas Operations for PG&E, where he is the R&D and Innovation senior manager. Go ahead, Francois.

MR. RONGERE: Thank you very much, Heather. Good morning, everyone. Thank you very much for having our presentation here. I wanted to present, in the continuation of what Qing has done about the activity of R&D for PG&E as a utility working with other companies to develop integrity and safety of our systems. So next slide, please.

It will not be specific to system planning and decarbonization. I will try to give an overview of the activities we have. So first, I really want to commend the idea of this meeting to facilitate the collaboration between all the different stakeholders of the energy and the gas system in California. My slide here, I tried to illustrate that. We are just a member of a very large network that include a broad number of stakeholders from industry, but also government, academia, etc. And Qing has mentioned several projects that we had the privilege to work together on it. And I think the term together is very important now that we have so many things to do in a relatively short period of time. So putting our forces together will help to address the number of questions we have. Next slide, please.

So that the R&D Program at PG&E is divided into seven major focus areas that aims to improve the system in term of safety, reliability, and affordability for our customers. You see here first is to understand the conditions of our assets and better know what our system is. Second is, is also to try to expand the life of the system at the lower cost. Third is develop, what we talk about is proactive operation and digitization in order to get a more flexible design of our system and better planning as well. Reinventing Leak Management, for us means two things. First, improving the technology to improve the leak surveys and management process, but also address methane emissions in collaboration with CPUC and Cal under SB 1371. Eliminating dig-ins, and Qing mentioned it earlier, the project about DPS based damage prevention is an example of that. But we have a several activities complementing this effort. Improving Construction Methods, whatever can be done in term of facilitating and accelerating the construction projects in our -- in our system. And finally, here is Decarbonizing the System. So we have started this initiative about three years ago in 2018 and have switched to the benefits of the collaboration and making sure that we can share with others. We have published an R&D - an R&D road map at that time that we are updating regularly in order to list all the questions that we want to address through these efforts. And we have shared that with Qing’s team several times. And remember, a good conversation in -- on March 5th with the team. It's on the PG&E website and public access, and I recommend you to have access to it if you would like to collaborate with us in order to develop a new solution on that aspect. Next slide, please.

Here is, and I will not get into detail of it. It’s same idea of presenting our perspective and our objectives in order to share and develop collaboration. We have established an overall roadmap of our activities. There are four pages of it so I will not enter it, but I wanted to have it in my slide deck as a reference for you to identify additional collaborations. So now we switch to the four slides ahead if you can. Sorry for that. A lot of stuff here. I don't want to get into details.

But I wanted to give you a few examples of the results of these collaborative R&Ds that we have paired from in the past few years. And in my example, they were the two examples that Qing has presented. So I will focus on others. But you can find the information in my slide deck. So next slide, please.

The first one is to get the gas system of -- in PG&E but is -- what is, I'm saying here, is true for SoCalGas and this R&D has being done in collaboration, also with SoCalGas and other utilities in the US and North America and Canada as well, through NYSERDA, which is an organization for us to share R&D programs.

So this technology helps us to inspect the complex pipelines that we have in our system. So generally, the inspection, internal inspection of pipelines is done with tools that we call Pigs, which are floating and pushed by the gas along the pipeline, inside the pipeline. Because of the complexity, the climate change, turns, valves, etc. of our systems, these tools are not really usable, and we have developed a robotic system that can actually be inserted into a live pipeline, as you see on the left side. The lower picture is an example of a project site that has been done at PG&E recently so that the tool is inserted in live pipeline and can navigate the pipes, collecting information and providing the same level of inspections that what we can obtain with Pigs on our very simple linear pipelines.

The recent features that we are working on, and I've just completed recently is developing system to identify crack-like features along the pipelines and so beyond the mass loss related to corrosion, looking at crack-like features. Also very important for us is expanding the range of these tools. Today it's about a mile or two and we want to go beyond four miles. And for that we have developed an Energy Harvesting System that allows this tool to go further. It's also obligational material characterization and the automation of the system. So it's a range of improvement with other systems that help us to inspect our pipelines.

And because of the time constraint I will -- it was, of course, impossible to present the R&D activity in 10 minutes, so I will jump to another slide. If you can either go two slides further if you can. Yeah. And continue to go two slides further. Okay. Another two slides. Okay. So one slide back.

I wanted to introduce another technology that has been developed in collaboration with members of groups around us. Again, this is done with our colleagues from other utilities, including SoCalGas and beyond California in the US and North America. Even with PRCI, which is Pipeline Resource Council International and actually worldwide. And is a new leak detection system that uses a technology developed by JPL to find methane on Mars. And of course, because of that, it's very small and light and we use its capabilities in order to develop new solution for hand-held device, as well as system on UAVs.

I think I'm at the end of my time, so I will stop here. Other slides present other activities. And again, for decarbonization, please check our Webpage -- website to get our road maps. Thank you.

MS. RAITT: Thank you, Francois. Commissioner Monahan, did you have a question?

COMMISSIONER MONAHAN: I do. Yes. Francois, thanks for the presentation. I'm curious about the R&D in like looking at the equity impacts of natural gas distribution. Is there -- is there a piece of your R&D that's relating to equity and cost?

MR. RONGERE: So in general, yes, I would say. Of course, our R&D efforts are to support the affordability of our system and the gas we deliver. So we effectively do that for most of our project, of course. Perhaps more specific --

COMMISSIONER MONAHAN: But I -- I guess I didn't see that in the, I mean I was looking at, there's a lot of little pieces to the slides but I didn't see cost in there and I didn't see, sort of, equity and how this impacts different households or different industries. Is that, I mean, where does that show up in your R&D?

MR. RONGERE: It show up in different projects. I have not effectively presented that especially. But of course, this is an element of our -- of our R&D efforts on a broad range of things, starting with perhaps renewable natural gas and the injection of biomethane [ph.] our system, but also the access to hydrogen moving forward and also the reduction of cost and optimization of our Integrity Management activity.

COMMISSIONER MONAHAN: Thank you.

MS. RAITT: All right. Thank you so much. We will move on to our next speaker. Our last speaker this morning is Jonathan Peress and he's a senior director for Southern California Gas. Go ahead, Jonathan.

MR. PERESS: Good morning, hopefully everyone can hear me okay. I first want to thank the Commission, the Commissioners and staff for the opportunity to be here and for SoCalGas to participate in this workshop. I also want to express my hope that everyone is making it to the other side of this horrible pandemic without too much harm and stress, not just out of concern for people in public welfare, but also in the hopes that we can actually get together to enhance and optimize the collaboration that's going to be necessary amongst all stakeholders and market participants to meet the challenge of decarbonization and move forward productively.

I've spent the better part of the last year both developing and implementing what we call the Business Transformation Workstream at SoCalGas, and that includes a significant amount of research analytics as well as different approaches, modeling for achieving and facilitating planning and decarbonization. Next slide, please.

And much of the backdrop to this is within the context of the Gas system Planning OIR that's pending at the CPUC currently. And there’s a certain symbiosis between the research and analysis that we're doing. The Gas system Planning OIR, the important issues that have been scoped and framed for this IEPR, and the recent commitment and announcement that SoCalGas made with respect to bringing our operations and delivery of energy to a net zero. And specifically what I'm referring to is our commitment that relates to Scope 3 Emissions. You've heard Melissa earlier speak to the fact that for the majority of our gas throughput, we are common carriers. We don't have any real meaningful influence over the decisions that our customers make in terms of providing non-discriminatory transportation service and never taking title to the molecules. So what that means is that in order for us to achieve this commitment with respect to Scope 3 Emissions, we need to be able to facilitate, advance, and actuate the policies that are being pursued by the State and by, and more broadly, in order to reduce the emissions of our -- of our customers. And that includes building electrification, that includes policies to address resiliency. And much of the work that we're doing and that I'll discuss today, which, some of which was referenced already, is intended to kind of create frameworks and approaches whereby we can understand and basically develop and move forward with the art of the possible in implementing this commitment. Next slide, please.

So Jason discussed in great depth and very effectively some of the hydraulic modeling considerations that are part of this research and analysis that we're doing. I wanted to focus specifically on one aspect of how our hydraulic model functions to get into how we've been enhancing it to facilitate the planning that we're discussing here and the different approaches to decarbonization. That second bullet talks about demand on an hourly basis from our industrial and power generation customers. And what we've really focused on is kind of the shape of that demand, because ultimately systems are planned, not relating to average throughput or daily throughput, but on hourly and instantaneous throughput and the shape of demand from our customers. We have to be able to meet that. So next slide, please.

So what we've done is we've developed a new Integrated Modeling Framework that takes our Gas Hydraulic Model that looks at the shape and the demand from our customers and applies to it modules that include a Production Cost Model -- Module on the electric side so that we can get an understanding of how our largest customer's electric generators use our system, as well as a Gas Market Fundamental Model so -- module so that we can better kind of play through the economics of when we would expect various users to want to, or need to use gas, and when it would be economic. So we talked a little bit earlier about interdependencies between the Gas and Electric System. In order for us to plan going forward, we need to understand those interdependencies and we need to be able to design and plan our system in order to meet those needs. Next slide, please.

So what we've developed with this framework is this Integrated Infrastructure Planning Tool that looks at various interactions that will implicate and essentially dictate how we need to focus our system and operate our system. And what we're doing with this integrated model is we're taking the different scenarios. So for example, Jonah discussed the CEC study on deep decarbonization that E3 did. What we're doing is we're taking those scenarios and we're applying them into this Model that we -- this enhanced Model that we've developed so that we can get a perspective, not just on what an end-state will look like, as most of those models focus on end-state, but also, on a going forward basis how we get from where we are today, to what that end-state model is projecting is the pathway towards decarbonization. So it's really important that as we think about our other public interest, you know, the other public interest objectives that we must meet, reliability, safety, just and reasonable rates, that we understand not just what the system will look like in 2045, but we understand and layer on top of that from today going forward. And so by taking this Integrated Planning Framework, we can sort of get granularity as between the end-state and the current-state, in terms of planning how we move forward. Next slide, please.

So one aspect, of course, that's critical to this planning and moving forward, is when we look at 2045, we know that there'll be a significant amount of the building electrification, electric vehicle charging, and that we'll see, you know, different patterns of use on our system. So we've been projecting forward what that might look like at, you know, numerous end-state studies have expressed the need to understand what that might look like. And we see, in general, this this pattern where there will tend to be peak year use of molecules on the system, particularly by natural gas fired dispatchable generation, which will need to be able to support those peak hour and ramping needs during the morning and late afternoon, and particularly during periods when renewable energy may not be sufficient or available, which are relatively predictable within the system. So we're using these tools to better understand how frequently those may arise and how we can best plan our system around them. So next slide, please.

So for example, when we -- when we've looked at the amount of incremental gas capacity that's needed to support resiliency and reliability, we've modeled different scenarios. So and I think as everyone's aware, virtually all of the decarbonization scenarios maintain a significant portion, if not all of the current thermal generation capacity in order to ensure resiliency and reliability during periods when there is -- when there are these larger swings or there is insufficient storage or renewable capacity. So this is just an example of some of the modeling that we've done to be able to project forward and understand that better. And you can see that in 2020 there's about 35 gigawatts of gas operating at a 40% average capacity factor. And you can see, going forward under different scenarios, how that might change. But the point is that while capacity factors remain low, the models are consistently maintaining, and in fact adding, this sort of resiliency, reliability capacity. And so we're really focused on how that will play out in the future and basically how we can decarbonize that capability. Next slide, please.

And this is just a very quick example that shows that when we -- when we model the different decarb scenarios through our Integrated Model, what -- the greater the more severe the deep decarbonization scenario actually, the greater the periodic peak day gas use becomes. And this supports a number of models that have also been run by CPUC staff, E3, and others. So if you look at the 2045 Deep Decarbonization Scenarios you see that California wide you're talking about almost five Bcf, and this is MMBTU but they align very closely, of gas being used by EGs on a peak day. Notwithstanding that over the course of the year demand, and throughput, and load are much lower. Next slide, please.

So just I wanted to mention a couple of other topics. Our Gas Transformation Study that we're working with UCI on has been funded as part of our R&D budget. And basically what that study is trying to do is develop sort of the Least Cost Highest Benefits approach for the various clean molecule uses that are necessary in order to achieve economy wide decarbonization. So we know that, and it has been discussed, those are likely to include that resiliency capability that I just spoke to, and industrial usage, which is a significant portion of that, quote unquote, hard to evade, but really the engine of prosperity of the State of California and heavy-duty transportation. So I just -- and we are in the process of developing what we call a Clean Fuels Asset Capacity Model that looks at how that system might need to be designed in the future. Next slide, please.

And lastly, I wanted to speak to some of the research that Qing and Jonah spoke to relating to Strategic Electrification. We know that the various end-use studies speak to a substantial amount of electrification of the distribution system, but what we really lack collectively is a -- is a understanding of the feasibility and potential cost considerations starting in the present, in terms of how we get from the present to some of those end-states. So as has been mentioned, we have developed a consortium with RAND, GTI, and others in order to move forward with a project that will identify pilots and functionally it'll put the SoCalGas system with our data, our hydraulic system data, you know, on the operating table and give the scalpel to other people and let people start focusing on what it will require, what it will entail, understanding both from a feasibility cost and rate of penetration standpoint, what electrification might mean to our system. And we expect that as we get into planning, we will be able to use this data, you know, to better, going forward, plan the system so that we continue to meet what we need to be while also focusing on a decarbonized end-state. Next slide, please.

And this is my last substantive slide, and it gets to some of the work that Jonah spoke to regarding Site Selection Criteria for Decommissioning. And so we've put a work group together and we're undertaking this research to basically, better understand what some of those criteria might be. And this is really qualitative. It's not meant to be quantitative. It's the beginning of a conversation. We’ve shared this with the R&D team, and we'll continue to work with them on this. But if you start at the bottom, obviously, where you've got a high pipeline O&M cost, that creates a bias towards electrification or full gas commissioning, full gas decommissioning.

On the flip side where, for example, you've got a diversity of end-uses where you might have some heavy industry closely aligned or sighted with our distribution system, that would tend to bias towards maintaining gas infrastructure. So this is illustrative. It just kind of shows the type of research and qualitative analytics that we're doing internally in order to work with Jonah and the R&D team and in order to advance the State's climate goals. So that really is the end of my substantive presentation. If you go to the next slide.

I just wanted to point out the two folks, myself and my colleague Despina Niehaus, who are implementing our Strategic Business Transformation Works Group. So with that, I'm available for any questions and thank you for the opportunity.

COMMISSIONER GUNDA: Yeah. Thank you, Jonathan, so much for your presentation and Francois for your presentation as well. I do want to kick off with a couple of comments and maybe questions and then see if any of my colleagues on the dais have any questions before I hand it back to Heather. So I just, at a very high level I think, and I just want to make sure I take a moment again to thank everybody for putting this workshop together. And I think, you know, what comes together today is the acknowledgement and continued coordination between the utilities and CEC, CUPC staff. And I think it's paramount and that we do that adequately to ensure that we have a robust conversation.

A few things I'm taking away from this are kind of of like really highlighting the interdependencies between the natural gas and the electric system as we continue to think through the transformation of the entire energy system to ensure our clean energy goals of decarbonization, reliability, affordability and equity. I definitely want to emphasize the need for transparency. And this is not going to be an easy conversation. We have a diverse set of ideas and points of view. And I think to the extent that we ensure that this conversation is happening in a productive manner, that's objective, robust and data driven, and transparent, I think we all will benefit in ensuring that we get to the end goals that we all are seeking here.

As Commissioner Monahan pointed out, there is an absolute importance that we need to put the emphasis on equity, not just, you know, in terms of the carbon emissions, but also the air quality, but also as the agencies begin to put these workshops and work in groups together, ensuring procedural equity for all participants to ensure that they have access to share their voice and share their point of view as a part of this broader thinking. So those are kind of my high level comments. I think this was a really helpful start-up conversation. I would imagine this natural gas evolution, and planning, and thinking will probably happen over two to three years, and I think, you know, we’ll probably span multiple IEPRs. And

I'm again thankful to Francois, Jonathan, my colleagues from CPUC and CEC for your wonderful presentations today.

With that, I do want to ask one question. If all the panelists, whoever are here, can turn on your video so we know, Jonah. And so just at a high level, you know, as we think through the broader, you know I think specifically to Jonah's presentation, the decommissioning of certain areas of the system. I would kind of like, you know, if the -- if the panelists can react to how do we ensure equity as we do that and how do we -- what are the opportunities, what are the key drivers of opportunities and some of the barriers that you see in a collective understanding of going through that process. Jonah, if you want to kick off.

MR. STEINBUCK: Yeah. Yeah, sure. So I think you know, part of it is around thinking about how do we minimize the costs of transition. So that's part of what we're seeking to achieve in this Data Driven Tool, is to look at what are the promising sites. Part of that analysis will consider, you know, what would be the additional investment needed to modify both on the natural gas side and also on the electric side to enable that transformation, and electrification and decommissioning. So by kind of targeting the kind of ripest opportunities early on, that's one way of keeping down the overall cost and, you know, minimizing the impacts on kind of the pressure on rates. Tying back to that feedback loop that I was talking about. So I think that's one key way.

The other way that we're talking, I think I mentioned doing some specific analysis for under-resourced communities because you know, we all understand that it's more challenging for some of those communities to engage in some of these planning activities. So if we can conduct some of the underlying analysis, create more of a platform for under-resourced communities to engage in the planning process, I think that's another way that we can address the equity in the process of our planning.

COMMISSIONER GUNDA: Thank you, Jonah.

MR. TIAN: Yeah, this is Qing.

COMMISSIONER GUNDA: Go ahead, Qing.

MR. TIAN: Yeah. I can share a little bit of information about these two decommissioning projects we are working on right now. So we, you know the, one of the requirements for these two projects, you know, they have to identify at least one side out of the low income and disadvantaged communities so we can take a close look at, you know, what are the priorities from the community. Another thing is, you know, we did a little bit different than what we did in the past, you know. We hired -- the project hired a dedicated funding for community based organization. So by, you know, this is a, I felt in my opinion, I think it's a good approach because, you know, they need to have a role in the project and especially, you know, during the Planning Phase. And we need to hear their voice. You know, what are the priorities?

Speaking of the barriers. I think, you know the -- at the end of the day is the cost. So while the idea -- one of the elements from our project, you know, we want to look into the economics. You know, what are the -- are there any existing funding or incentives we can leverage so we can, you know, help with those communities when we are trying to do these kind of decommissioning projects. So we are also trying to look into that also.

COMMISSIONER GUNDA: Thank you, Qing. Any other comments you might want to add?

MR. PERESS: If it’s okay, Commissioner Gunda?

COMMISSIONER GUNDA: Absolutely, Jonathan.

MR. PERESS: I think Qing raises a very important point about cost allocation and the need for looking at the equities of cost allocation it, you know as we -- as we do this, undertake this planning, it's clear that there is a set of capabilities and services that are going to need to be provided by molecule's, including an order to facilitate decarbonization of the electric grid and electrification. And so we have to be careful as we move forward in doing so that by -- as people are pulled off of the gas system, that there are costs that are being imposed on those that remain on the gas system in order for the system to decarbonize and to electrify. So we have to give a great deal of consideration to what the Equitable Cost Allocation Approaches will be, as that -- as that sort of trend line moves forward.

COMMISSIONER GUNDA: Thank you, Jonathan. Actually, I have another question that I would actually start with you and then maybe other panelists might want to chime in. So specifically, I think Melissa kind of showed a chart earlier, Jonathan, about the declining the demand. But I think you also showed in your presentation, I think that the -- kind of the volatility of need, for lack of a better word, or high frequency, I mean narrow. I think lower number of times but higher volume, I would imagine. Just wanted to get your sense on, as we -- as we are trending towards the decarbonization goals, how are you seeing in terms of both the changes in the peak, but also the times, as you know there has been conversations specifically on the electric side, that we might be having, you know, certain peaks happening in the future in the off peak times that are typically, you know, in the late night hours in winter. And how is SoCalGas thinking about planning for those elements? Any kind of consideration there? Just your perspective on the changing nature of demand and how you are thinking about planning for that.

MR. PERESS: So let me -- let me start in the present, Commissioner Gunda. So we actually know that over time with the decarbonization of the electric system, that kind of the means by which the peak demand on our system is manifesting itself has been evolving. So if we look at 2020, for example, there were 77 days, excuse me, 77 hours where we shipped more than 100,000 dekatherms per hour, 2.4 billion cubic feet equivalent per day. The vast majority of those were to serve electric generators, not to serve our core customers. So that evolution is already at play. We're seeing it at play. When CPUC staff in the SB 380 proceedings started modeling what the system will look like in the future, they showed that that peak-day gas tanks from the electric sector will dramatically increase as we move towards a more electrified system, not decrease. So we've been modeling that out. We've been working on different structural models from a cost allocation standpoint. We've been starting to convene our planners on the, you know, on the transmission and distribution side to come up with what are going to be the best set of options and scenarios for addressing these needs. I think what, where we are right now is we're getting our hands -- a handle on and being able to start quantifying the trend-line that's already underway and how that might evolve into future.

COMMISSIONER GUNDA: Thank you, Jonathan. I don't know if Eileen, or Kristina, or anybody else might want to chime in. Eileen, please go ahead.

MS. HLAVKA: I'm not sure if I'm prepared to add about Jonathan's particular comments, but certainly maybe this is a time to note that we do have a variety of proceedings that are related to this topic. The Aliso Proceeding that we spoke about, so it’s I1702002. And the Long Term Gas Planning Proceeding that has been brought up a little, but wasn't really a focus for today, it’s 2001007. And we certainly look forward to discussions on the variety of these matters and appreciate the collaboration with CPUC.

COMMISSIONER GUNDA: Thank you. I think before I hand -- pass it onto Commission --

MS. HLAVKA: In collaboration with you, of course. Energy Commission.

COMMISSIONER GUNDA: Absolutely. I took the spirit. So before I hand it over to Commissioner McAllister, I just want to reiterate my thanks to all of you who are participating on the Gas Working Group. Jonathan, I know you've been a regular participant in those and advancing the conversations there. I think the more robust conversations we have and then have like a venue where we're exchanging this diverse points of view, it is -- it is better for the State. And then the last thing we want to do is act without all the information in hand. So I applaud all of you for your continued engagement, including my CPUC colleagues, and then I'll pass it on to Commissioner McAllister.

COMMISSIONER MCALLISTER: Great. Thank you, Commissioner Gunda. Let's see, I had a kind of related question, and I think several people could take a shot at it, but so appreciate Jonathan's point about the sort of the sum total of the core plus the noncore and kind of the peakiness [ph.] of that, largely, as I understood it, largely driven by the noncore. I wanted to ask about the core, though, customer. And you know obviously, that is I mean, you know that is the center of attention in terms of like the obligation to serve and some pretty key parameters here. And you know, we've talked about sort of the declining demand, declining retail demand.

We just came out with a report, the AB 3032 Report, that the legislature asked the Commission to put together. It's out in draft form, and it looks at what the scenarios are for, you know, assertive decarbonization of our building stock in the State. And the scenarios that kind of get us to 40% below 1990 have a lot of electrification of core customers just really inherent to those scenarios. There's definitely gas efficiency, there's some renewable gas, there’s electric efficiency. All of those contribute to decarbonizing, you know, at least in the near term. And, but electrification really is a core long-term strategy.

So I guess I'm wondering, and this could go to Jason and to Jonathan, possibly to Francois, so that you know the modeling, I guess the modeling of getting ahead of like which system, which pieces of a system might be decommissioned, that's absolutely necessary. I guess I'm wanting to know a little bit about the flip side. As, you know, if we're successful in driving electrification, you know, noncore customers, you know how is the modeling able to I mean, hydraulic modeling presumably would be able to raise flags if, okay, you know we’ve -- the density of electrified customers in, you know, in this area of the grid makes -- reaches some kind of threshold that makes that part of the grid unviable, or you know decreases flows, affects pressure, whatever. And I guess I'm wondering if the hydraulic modeling that we're doing, or that the utilities already do, can kind of capture that. The scenarios are actually able to capture that and kind of back into the same issue that we've been talking about.

MR. ORTA: I'll start. I think one of the things

I wanted to reiterate in the previous line of questioning from Commissioner Gunda that I bring up here is that there's, especially on the transmission and local transmission level, you'll see a lot of the infrastructure serves the purpose of transporting gas to blocs of customers along long distances. So that's going to be a challenge there. But you can -- what you can do, and this is one of the things I mentioned in my presentation, is look at different demand scenarios on these models for core and noncore customers. You know, and that's one of the -- it's one of the other related tools we're trying to develop is, are -- is developing those scenarios. And we can put that in the model, and you can see differences in flows, differences in pressures and how infrastructure is used.

But I do want to reiterate that even though you might have changes in demand, the way the system is set up it, you also have the challenge of infrastructure going, you know it’s that example I brought up in my presentation of the, you have a pipe that goes through, say a bunch of residential communities that, you know, may be able to electrify, but that pipe might go to a noncore customer or another customer that may not be able to electrify or might still need to get gas off of that system. So there is those complexities. But yeah, I mean a model, we can look at different demand scenarios in the future.

MR. PERESS: So if I may, Commissioner McAllister. I think you're raising a really important need going forward. You know to the point that Jason just made, I mean we're using an enhanced Hydraulic Model that primarily looks at our -- at our Transmission System more so than our Distribution System. And in order for us to really understand how much, at what cost, at what rate we're going to be able to electrify and decommission. The tools from a planning standpoint are going to need to get significantly more granular and I'm not an engineer or a system operator, but we understand that to be the case. And that's an aspect that we're actively sort of trying to advance, both from an internal standpoint as well as in some of the conversations that we have with Jonah and his team. So there is a -- there is a real need to get the Operational Planning Tools to kind of go to this more granular level. I mean, let's be frank about it, what we're -- what we're really focused on at this point are end-state models and sort of predictive models, right. That's pretty much where we are.

COMMISSIONER MCALLISTER: So thanks for that. That's where I was driving at. Is how, you know, can the granule -- is the granularity there to be able to embrace those kinds of questions and know kind of when you're at the tipping point to be able to say, okay, now we need a solution for this neighborhood because half of the houses are now fully electric, right. And so anyway, I appreciate that. And I guess I won't ask any more questions because I want to leave time for public comment. But this seems like a real meaty topic for the working group and for future, you know, collaboration around as we all kind of co-evolve our various models and hydraulic modeling tools. Go ahead, Jason.

MR. ORTA: Just real quick. I just wanted to raise something, that another collaboration that we are working on with the gas utilities is that in March 2017 that the Commission adopted the IEPR Natural Gas Demand Forms. And so those forms are due at the end of the month. And you know, and we'll start, you know my colleagues, and we'll start looking at those and you know, having the discussions about, you know, improve our Demand Forecasts and look at what's in those forms as well.

COMMISSIONER MCALLISTER: Great. Okay. Yeah. We're collecting a lot more data and that opens up tons of possibilities. You know, individual level, customer level data. Opens up lots of possibilities, but obviously with all that data we need to be judicious. So this is a great conversation. I'm glad we're starting it today. And I want to just echo Commissioner Gunda. Thanks for everyone for being here and for your collaboration, generally. I really am heartened by, just to see the level of engagement and the level of expertise around the table here. So thank you all for that great work and being here today.

So I think we go to public comment. Is that right, Heather?

MS. RAITT: That's right. This is Heather. Thank you so much to all our panelists and Commissioners. And so it is -- we don't have -- we were going to do take some Zoom Q&A, but we don't have any open questions. So we will go on to public comment. And we have Dorothy Murimi from the Energy Commission’s Public Advisors Office to help us with that. So go ahead, Dorothy.

MS. MURIMI: Thank you, Heather. Onto instructions before we begin. So one person per organization may comment and comments are limited to three minutes per speaker. If there are several parties interested in commenting, we will reduce the time to one point -- one and a half minutes per speaker just to make sure we can get everyone's comments in. For attendees that are using the Zoom online platform , use the raise hand feature to let us know you'd like to make a comment and we'll call on you to open your line. For those on the phone, dial *9 to raise your hand and after we unmute your line, dial *6 to mute or unmute your end -- on your end.

I'll start with folks using the raise hand feature on Zoom. Please state and spell your first and last name and state your affiliation. Also, please don't use the speakerphone feature as we may not be able to hear you properly.

So starting with folks on Zoom, I see Martine Schmidt-Poolman. Martine, unmute on your end and begin commenting. Well we'll move on to the V. John White, for now. John White, please unmute and begin speaking.

MR. WHITE: Good afternoon. Can you hear me now? Thank you very much.

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

MR. WHITE: Thank you very much for the opportunity. And as is often the case, the CEC is providing a holistic look at an important set of issues. One of our problems in this space is the interconnectedness of things. And yet it's -- we subdivide things into specific proceedings. So these workshops are really helpful because they have more of a big picture feel to them. And so there's a lot of ground to cover. A couple of points that I wanted to make in support of Melissa Jones' observation about history of planning on the gas has been limited, and it needs to be proactive and ongoing. We need to think in terms of an orderly phase out, in my opinion, the orderly transition. I think it's very important that the load forecast be a live product and that it be updated and scenarios and not just pick a single number and let that drive everything.

Second, I think the price impacts on the electric power sector speak to this volatility of demand, but it's met with the volatility of prices and cost. $900 million of unexpected money in the -- in the Power Sector in 2018 tells me that we're paying too much money and that the gas system, however reliable it has been in the past, is a source of volatility and higher costs in addition to the environmental consequences for disadvantaged communities living with this electric sector demand. So if the electric can turn to Aliso now and finally with the arrival of Commissioner Guzman Aceves as the presiding Commissioner on Aliso, we're seeing some linkages between that proceeding and other PUC proceedings.

In particular, the demand forecast needs to be reflected in the -- with the policies we have adopted on building electrification, on GHG reduction. And then specifically, you've got to take accountability of [indiscernible] 100% plan, which is not just adopted, but is operational. Right. They are pursuing and implementing that plan. That's going to affect gas demand. That's going to affect Aliso. If you look at what's left, the size of the electric power sector, which we ought to be able to diminish its gas demand because that's what our policies tell us we need to do. The other place to look is in the Industrial Sector, particularly the refineries. The largest use of natural gas in the Industrial Sector in Southern California is in the refineries. Okay. The refineries make hydrogen. That's what that gas demand is for. There are synergies, particularly say take LA, DUDP, which has done a lot of thinking that is beginning to be operational on green hydrogen, if you built in-base electrolyzers down in the port area, there's pipelines the existing system can deliver to the refineries, and they can earn low carbon fuel standard credits for those emission reductions if they use 100% green hydrogen. So this is -- these are some things we'd like to Commission to consider as we go forward. And I thank you for your attention and your time and look forward to further conversations.

MS. MURIMI: Thank you for your comment, John. Just to reiterate for folks on the phone, you can press *9 to raise your hand, and then once we unmute you, *6 to mute or unmute. We'll move on to Jeff Malin. And I apologize if I've misstated your name. That's Jeff Malin. Go ahead and unmute.

MR. MALIN: Can you guys hear me?

MS. MURIMI: Yes, we can.

MR. MALIN: Okay. It's Malin, and don't worry about it. I get that all the time. Jeff Malin from Applied Medical. We are a noncore industrial customer on SoCalGas's network. And, you know, we've had the pleasure of being invited to the Gas Working Group. And Jennifer, I do look forward to talk to you about that polar vortex issue.

Our issue, and one that I'd like to bring up to the Commission here, is that -- is one of storage. We buy, you know, on the wholesale market. We have to tell, you know, our suppliers how much net, how much gas we think we're going to need. And then we're really kind of, you know, put in a lane where we can't, you know, take more or take less until we get alerts. And we -- and we are bombarded with alerts. We get alerts about now you can have more, now you can have less. And those alerts really frustrate our operations. And what we've noticed is that, at least in our view, it's an issue of storage. We don't have enough storage capacity. If we had abundant storage capacity, we probably wouldn't be getting all those alerts. And frankly, it's a little unfair for the customer to have to help the network with its balancing needs. Our request is to consider more storage.

And then secondly, and Jennifer, maybe I'll save the polar vortex issues for the Gas Working Group and maybe just leave my comments at the storage issue for now. But thank you for taking our time.

MS. MURIMI: Thank you for your comment, Jeff.

Checking for hands again. For folks, you can use the raised hand feature, looks like a high five and if you're on the phone, *9 to raise your hand. Seeing none, I'll hand the mic back to you, Heather.

MS. RAITT: All right, thank you. Actually Commissioners, did you have any closing remarks you'd like to make?

COMMISSIONER GUNDA: Heather, thank you so much. I don't have anything else to add, but I just want to say thank you again, everybody, for taking time to attend today and specifically, John and Jeff, for your comments at the end. Thank you so much.

MS. RAITT: All right. Super. Well shown on the slide, this is Heather again. Written comments are due on June 3rd and they're always welcome. And there's some information there about how to submit written comments. And also there is information on the Notice. But if there's nothing else, then I think we can conclude this workshop. Thank you.

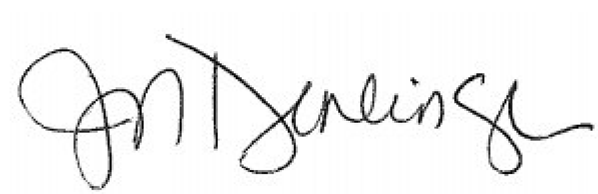
(IEPR Commissioner Workshop on Natural Gas Infrastructure adjourned at 12:26 p. m.)

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 disinterested person, and was under my supervision thereafter transcribed into typewriting.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 15th day of April,2020.



____

Jacqueline Denlinger
AAERT CERT # 747

TRANSCRIBER'S CERTIFICATE

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

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

IN WITNESS WHEREOF, I have hereunto set my hand this 25th day of August, 2021.

____

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

TRANSCRIBER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were transcribed by me, a certified transcriber.

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

IN WITNESS WHEREOF, I have hereunto set my hand this 25th day of August, 2021.

Barbara Little
Certified Transcriber
AAERT No. CET**D-520