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Hi, everyone. We're going to get started with *Forests Moving Beyond Risk Mitigation to Value Creation*. This presentation will be just like the last one. And that there's an interactive set of questions that you'll be asked to participate in. If you could go ahead and scan this QR code and answer the first question, that I'll set you up to be ready to participate for the rest of the session. And if you can't use the QR code, use app.sli.do and you'll be in.

One other note, this is the last session before the final presentation. Please stay here and it will be streamed for you on this screen. And welcome Kevin Johnson.

OK. thank you.

[APPLAUSE]

Can you all hear me OK?

OK.

OK, good. So let's dive right in. We have a limited time here and half hour waiting. So that's me. So we're going to talk about wildfire resilience partnerships. That's the theme here. And really focusing on analytics as this is the theme conference. So first provide context for what the heck are we talking about before we start diving into the weeds.

So to set context PG&E, more than 50% of our service area is high fire risk. And you can see about 34,000 lines of power line crisscrossing that high risk area, which means just a lot of fire potential and fire risk that we face. It's a dangerous operating environment.

You can think of, when we talk about fire risk, related to utilities. There's a sequence of potential things that would happen in order to get a catastrophic outcome. So you could have an equipment or asset failure, which could cause a spark. If there is enough fuel, it could cause ignition. If the right conditions are there, it could spread. And then could become a catastrophic fire.

A lot of the mitigations early on in our journey were-- on the left side --trying to reduce that equipment and asset failure. And over time, we've developed more of a portfolio, to the right. And what you're about to see is very much focused on the right side. We want to prevent catastrophic outcomes and fire spread.

So for some context for those who don't live and breathe forestry all day. California, for thousands of years saw maybe four to 13 million acres of forest burn every year, land burn every year, depending on who you ask. And so we have ecosystems that are fire dependent or fire adapted, so include plants and animals. And so if you don't have fire periodically, you end up with forests like you see at the top left, very dense, very overgrown.

And when fire sweeps through, it can reach temperatures that have not been seen for a really long time. You can have the fires climb up the trees, and get into the canopies, and blow away, and cause ember casts. And then the fires can be so destructive that you basically can wipe out the soil and create a moonscape, and actually lose the forest and ecosystem conversion. It's all very, very bad. And we've been seeing a fair amount of that.

And so on the right, if you manage forests as being more ecologically minded in the forestry management, proactively managing it when a fire sweeps through, it can be low level on the ground and actually can be regenerative. It's actually what the forest again evolved for and the animals. And so it's actually a very positive thing to have that kind of fire. So the goal here is basically to have a lot more of what's on the right and a lot less of what's on the left. And the question is, how can we help.

So there are three ways that we're focused on. Helping to create resilience is the catchword here. So one is, if we can help communities build wildfire resilience, then they can live better with fire than they can today, recognizing that fire is going to be here in some way, shape, or form, almost no matter what we do.

The second opportunity is to restore forest health. And if we have a healthier natural environment around us, we will dramatically increase the risk to our structures and our communities. Then third, if you're mimicking what it's like to use fire, but if we don't use fire, because people have houses. They don't want to have burned down all that kind of thing.

You're often going to be manually removing fuels, cutting them down and removing them for that proactive forest restoration. It's very expensive and it's very hard. And so if there are ways to reduce the cost and the challenge of managing wood, you can then do the other things a lot better.

So if you put it all together, they actually reinforce each other. So if you help build community wildfire resilience, then you're more likely to have people get less upset if there's good fire happening nearby for example. If there are better ways to manage wood, you actually can then make it cheaper and easier to then do the other two above. And so I like to think of this as we can create a positive reinforcing flywheel here. As we do these you help the other two. And we can basically make things that seem impossible now, actually more achievable as we lean in moving forward.

So we can't do it alone. A lot of this work would be beyond our rights of way. And that's really where PG&E has jurisdiction and control. So if we want to influence outside, we need to do it in partnership with our communities, with a lot of different types of partners. And so first of all, what can we bring to the table?

PG&E, we have a lot of expertise. We have registered professional foresters. We have Cal Fire alum. We have US Forest Service alum. We have a lot of data. We have really high powered analytics. We have a lot we can bring to the table to try and figure out how to help.

The second thing we can do is, we're a really big credible entity that's going to be around for a long time. And so if you want to try and crowd in other people to fund bigger things than you could do alone, we're a credible entity to enable crowding in of that kind of support. And then third, we do have a bunch of assets and rights of way that we could integrate into these projects and/or integrate our work.

So really, what are our goals in trying to do all this? There are a lot of goals. But the three that you could really build really big, powerful, meaty business cases around are to reduce wildfire risk. And again, it's through reducing wildfire consequence as opposed to ignition risk.

The second one is to bolster affordability. So if we can find-- build another tool in our tool set to cost effectively reduce wildfire risk, we can increase trajectory of our rates, while addressing more risk. So the goal is better outcomes, less cost, so we can invest in all the things we need to invest in.

And then third, we also could potentially get improved reliability from doing all this too, from reducing veg caused outages and potentially less proactive power shutoffs. So that's what we're doing and why. So first question for you all as this is an active participation game as the previous two rounds were, how would you in a few words describe what you just heard from me? Cue music.

[MUSIC PLAYING]

(SINGING)

Ooh ooh

Ooh Ooh ooh ooh Ooh Ooh

Ooh ooh ooh ooh Ooh

Ooh ooh ooh ooh ooh Ooh

OK. End music. We're going to move on. Oh, we have another question. Do you have any points of confusion, concern, or excitement from the elevator pitch you just heard, which is absolutely what this was? So we'd love to hear any commentary from what you heard so far, because for a lot of people, this is pretty darn new stuff.

[MUSIC PLAYING]

(SINGING)

Ooh ooh ooh ooh ooh ooh Ooh

Ooh ooh ooh ooh ooh ooh Ooh

Ooh

One minute.

And for those of you who may not have been in previous sessions, we're going to get to see some of the more interesting responses coming out of this at the end. So we'll get to see some of the fun stuff coming in, hopefully.

[MUSIC PLAYING]

All right, we'll keep moving.

OK, so we're at an AI energy conference, and you may be asking, why did we talk about any of that? How does that fit at all? So we're going to talk now to some of the analytical portion of the proceedings here. So how would we target this kind of work to make it really worth our while? So we'll walk through the flow that we're building towards in building this kind of new tool in our tool set.

So starting at the far left. First step, is to down select high value regions. And so, a lot of inputs to that, we can use our own wildfire risk modeling, of which we have a lot of opinions on where some of that risk is. Two, is we have been building out layers of protection. It's not a secret. We're doing a lot of undergrounding, overhead hardening, a lot of different types of risk mitigation. So looking at that holistically.

And then also, what's the state of the location there? Is the community relatively hardened yet or not? What's the state of the environment? Is it overgrown? Has it had fires recently? Suppression, capacity, is there someone there to put the fire out? How robust is that? And is there a mutual reinforcement nearby?

And then, are there reliability challenges to be addressed there that could also be a proxy for potential ignition risk? And then last, what is the overall wildfire history? And how frequently does that area have these kinds of fires? So using that to then focus a little bit down on where to really focus more attention.

The second step is to profile the opportunities within the region. So one is, are there areas within that area that are particularly high value seemingly to PG&E? Often these are going to concentrate around where we have equipment for obvious reasons. The second one is, a lot of communities or different regional entities have their own prioritization process. What have they determined are the biggest focus areas for them? And does that overlap with what we're trying to do?

And then last, in some cases, there might be projects in some of these areas that are happening right now, are being planned and could happen next year. Could we just opportunistically jump in and help accelerate that and help it move faster without having to go into the planning step? And you can see there's some iterative kind of loops here.

Stage 3 is then, in an area we know where we'd like to see something happen, then need to profile who are the right local or state agencies to be interacting with on this. Who could actually do the work, which is a very unique skill set, again, in certain types of companies that can support or organizations?

And then there might be key landowners who are really critical to a given area being able to be de-risked or not. And it's important to know if they would be interested in this kind of work. And then last, are there others that want to fund along with PG&E, who also see value.

And so, assuming we have a project, the next step is to actually plan it. And so co-create and support high return on investment projects with partners. So where does PG&E getting a lot of value for us getting involved with the project? We also need to secure permits and pool resources as needed. And then where it makes sense, to integrate with our own operational planning so we can maximize the value of that work. With that plan, then to execute.

And this is a new kind of twist for PG&E. In most cases, if it's beyond the rights of way, PG&E would not be doing the work. And even if it's the fuels underneath our wires, PG&E may not be doing the work because that's not stuff we do today. And so in a lot of cases, we would also be funding third parties who would be going out and doing that work, really community partners or other groups that the community would like to see do the work. Have them do that work where there's mutual value between us and other parties, including the community.

Again, we need to coordinate with PG&E operations as needed. And then make sure that we're getting quality out of that work and make sure that the funding is being well used. Then last step is we got a report on progress and performance metrics as a robust mitigation measure. Got to measure the risk reduction. Did we actually get the risk that we thought was there? And fine tune that.

And then we also need to think about ongoing maintenance. What you'd hate to do is do a lot of this work, and then in five to seven years, the vegetation has grown back and the risk is gone. There is value there, but it's limited. And oftentimes the most expensive work is the first treatment. And after that it can be cheaper. So do the work. But the intent is to think about this as a long term kind of risk mitigation.

And so last, just examples of the kind of inputs to this kind of targeting, our own internal risk evaluation and reliability measures. Another one is, what are those local plans that are already in place that we could reference? Another critical one is one way in, one way out communities. And we can think about their roadsides, where it may be hard for people to get in or out.

We may have distribution lines running along it. Roadsides often have more ignitions. Our equipment could cause ignitions. And if heaven forbid, something were to happen in our distribution were to fall down, people may not be able to get out or fire trucks may not be able to get in. So keep those in mind.

And then there's wildfire behavior modeling. What are the most likely pathways? What are the really high value areas for this work? And then, how many structures do we think we might save in different scenarios, looking at that probabilistically? You can think about this, there's a lot of opportunity here for targeting, for optimization, for artificial intelligence. And that's where some of this stuff is going. How do we think through all these different variables, including community input, to figure out what are the highest value areas for PG&E to be focusing his attention with this tool set?

So with that, we are going to our next question. Get ready. Any suggestions on how to improve our proposed approach to targeting resilience partnership projects? We're particularly interested in AI and ML solutions.

[MUSIC PLAYING]

Here we go. Moving on to our next portion, valuation. So now we've thought about targeting a little bit. How do we value this, so it's something that we actually could invest in as another investment category, which it's not today? But what makes something new, that is absolutely something that we could invest in and with confidence?

So first, baseline for how do we think about risk. Risk typically, the risk bow tie likelihood times consequence equals risk. And again, likelihood is things like where ignitions have happened in the past and where and when our models think ignitions might happen in the future. And so that's often been, when we were doing mitigations, often we're affecting the left side of that equation.

In this case, we're focused on reducing the consequence. And so you can think about wildfire spread modeling and values at risk as determining what the consequence is. So by reducing consequence and in this case keeping likelihood more constant, we can also influence the risk score potentially by a lot.

So how would we think about this as an investment category and valuing this quantitatively? So really, we have consequence modeling that we already have. What we don't have are tools to really toggle that consequence to really think through what is the before and after risk to then create that valuation.

So the key missing data points for us right now, if you treat a certain plot of land, say that it's 10 acres or 100 acres, whatever it is, and say it's a half mile from a circuit. You're not entirely addressing the risk of that circuit, because there's more around that circuit than just that plot of land a half mile away. It's some percent of that circuit's risk. So the first question is, what percent of that circuit's risk does that land represent? There may be more than one circuit, it could be transmission and distribution. You get the idea.

The second one then is, how much of that risk is reduced by doing this project? And so you can think of a few different metrics along those lines. What is the expected flame length before and after the project or rate of spread or ember cast? Or how much tactical suppression value is there before and after doing that project? So firefighters can get in and do better work.

So in the middle you can see some basic modeling before or after fuel types of toggling, before and after fuels treatment. And again, you can think of this as being controlled burns, but more in the case of typically mastication, tree thinning, those types of mechanical projects will probably be more the norm. You can see on the right, a lot of the distribution looks the same. This is flame length. And in the case of this analysis, you can see there's this big bar here of 50 to a 100 feet of flame length. And after the treatment that shifts over to this 2 to 5 feet.

And so what you're looking at there, is removing the tail risk from the really, really big fires, the ones that we really want to avoid. And if you're getting below 5 feet all of a sudden, that's something the firefighters can actually fight. And so that's what we're really trying to accomplish. And get rid of that tail risk, which is where the worst outcomes exist.

And so how would you make this something to value? There are really just a few metrics that we need to put this into a discounted cash flow model and start to make investments out of it. So one is, what is the impact on risk before and after? The second one is, how much does it cost to do the work? But important to that is, what's PG&E share of that cost? Because the intent here is that PG&E is not funding all this work, because that's not our job as a utility. But we absolutely have some shared value in this with others.

And we basically would build our business cases off of what is the PG&E share of the total execution of the project. So if we're doing a third of the project or paying for a third of the project, we'd only be counting against the third of the cost of the total project as PG&E cost.

And then you have to factor in ongoing maintenance if you want to keep that. And also understand what is the maintenance frequency. And so if you're comparing this to say, infrastructure investment, those are decades long durations. And so what is the intent for the long term management? And then on the right, you can see basically what is the net risk. And say, it's 50 years, over 50 years. And what's the benefit cost ratio?

So one is, what's the total risk reduced? And you'll have a lot on big projects there and a little bit on small projects. But you might have very cost effective projects that are small that don't reduce that much risk. And so between those, you can factor in what are the types of projects we'd want to move on for different reasons.

So with that, does this structure make sense to you? What improvements would you propose? How can we make these types of third party treatments and resilience projects investable? So welcome your thoughts on that.

[MUSIC PLAYING]

But we're going to proceed to our last section here and in some respects, the most fun of all. How do we get this funded and working at scale? It's the next question and more AI opportunities here too. So to review primary business case driving outcomes from doing this kind of work, one is to reduce wildfire risk. And that's really consequence and liability in a lot of cases for PG&E.

The second one is affordability. Can we produce a lot more value at less cost and influence the trajectory of our rates? And then third, can we improve reliability? That said, there are a ton of other. There's a long tail of other benefits too, which ideally, we would also like to be able to quantify and stack. So you can think of asset defense not just from the power line fires, but from any of the fires. If we don't have to restore and rebuild as much equipment from fires in California, that's an absolute savings.

Another one, if sparks fall on what is not abundant dead fuel, they may not become ignitions that are portable. And so we can actually reduce our ignition rate too. By working with partners, we can create efficiencies and actually reduce operational costs. This is an obvious path to decarbonizing-- which I'll talk about in a bit --that could be low cost.

We could spend less on energy during emergencies than we do today, have environmental benefit, some pretty clear social benefit, and then might be able to get better access to insurance than we can today to. So those are all things that we could potentially build in on top of those three foundational value propositions.

But then there's other people too. And so this is the concept of value stacking. So you can see there might be other partners who have other values, which we'll talk about in a little bit. And they may want in on products as well. Some of this stuff happens right now. So it's not like we're making this up. But then on the PG&E side, there could be two or three value streams that we would get and also potentially different budgets we could potentially pull from, so that we can get layers of value while these partners do too.

I think the next slide is a question, it is. And then we're going to get to the fun part of what are some of these real stacking opportunities coming. But first, what is your initial reaction to the proposition of value stacking and this approach? And would you want to get involved?

[MUSIC PLAYING]

Let's dive in to the remaining portion here. And then we can get to see your insights and do Q&A. But before we get there, Oh, another optional question. Please provide the name of your company or organization if you'd like? I'll give you tens seconds for that. OK.

[MUSIC PLAYING]

All right. We'll keep going.

So we've already seen there are a lot of potential values. And frankly, a lot of this would be in new types, new categories of analysis. And again, I think this is opportunity for new AI, ML solutions, new ways of looking at investing in avoided costs. But that's not all. There are all these other value streams too, which could come from other parties that also benefit from this work. One of the great things about this category of work is there's so much value created. Part of the challenge is, it's split across many different beneficiaries. But if we can pool together, we can accomplish a lot more together.

So in the category of non-traditional co-funding for these kinds of projects, one is internal transfers. So for example, Inflation Reduction Act money, some of that just went straight to forest. And you don't have to bid on it. They just got it. And so how do you work with national forests to get more done in the right places?

There are also grants that can be applied for, such as US Forest Service grants federally or Cal Fire grants at the state level. There are also water value payments. And so if you thin forests and remove the smaller trees and leave the big healthy ones, you have less straws in the ground. And there's more water that then gets down into the water system. It's actually better quality water. And then also, if you avoid massive fires-- which you'd be doing in that case --you have a lot less likelihood of landslides and mudslides and big damage to the water infrastructure that we really need in this new changing climate. So that's a real thing with real dollars with it.

Another one is, avoid smoke and the carbon associated with massive smoke. And so like the 2020 fires, basically produced enough carbon to wipe out all the carbon saved in the California energy system in the previous 15 years, or something like that. It's not a small number or amount of carbon that's actually avoided. That's often not counted on the carbon books, but it's very real.

Another one is that, if you then take the carbon from removing this wood and sequester it in some way, shape, or form, biochar being one obvious example, companies will pay for that too, as a means of achieving their net zero goals. And so that's an active market right now. And then there are also groups that want that wood as a feed-stock for creating, say, bio-fuels or other value added products. And so they may actually pay for this wood that's a waste right now. So the stuff that's dangerous for the state also could be a valuable economic resource if we do things right.

And so there's one notable pilot right there, West Biofuels, where we're trying to do a pilot to create RNG with them. And then local businesses for example, if you own a timber company, you probably want to have a reduced the risk of fire in that area. And then local property owners may see interest in chipping in to protect their houses and their communities and their family. And then there's also charitable programs and technology.

The exciting thing about this slide is that this is not theoretical. We've actually have an example of all of these already happening. And they've all been happenstance or part of a different program. But these are all basically real, or we're going to be testing them very, very soon. And what could we do in this nature, if we're also doing it proactively and designing programs and partnerships to really take proactive advantage of this, to again, pool these resources together to transform the state in a positive way?

But that's not all, because there's also a lot of other values too, that we can't quantify yet, which we don't have buyers for yet, but we certainly could and is very, very much possible. So on the people side, PM 2.5 is basically very small particulates that if people breathe it, causes massive health issues. And so there are health care companies that could save a lot of money if there are less people breathing in PM 2.5. And that's not just in California, many states away you can see those benefits too. So could we quantify that value and find health care providers who basically want to create that value?

First responder safety, pretty obvious one. There are organizations who really like healthy and resilient ecosystems. And that's a byproduct of this too. And so groups can pay for that. And also preservation of biodiversity, California being a global biodiversity hot-spot. That's good to try and protect too. And then prosperity, it's a little hard to get insurance these days, depending on where you live.

And that will trickle right through to property values and the ability to sell your house if you want to. These are all things that are teetering more than we'd like to admit right now. By doing this, we're addressing the root problem here, which ideally, could help improve this. And there are absolutely ways to potentially get at insurance value too.

Not to mention the ability to create quality jobs in low income rural areas, ability to enhance recreation and tourism, and for cities to be able to pay for themselves, avoid massive suppression costs every year. These are all things that there's not necessarily a buyer for it today, but they're very real. And there's opportunity on the analytical side to quantify these as well, to then try and pull this money in too, so we can get just massive work done. So with that, that is my last slide. And we are compiling the outcomes right now. Are we in a good spot?

We good.

Excellent. I'm going to turn it over to Chris Benjamin. Our sustainability director, who has graciously offered at the last minute to compile and synthesize all of your insights.

Yeah, all right. Well, we're in the homestretch here, after a great day. And it's been a pleasure working with Kevin at PG&E, and just seeing this work continue to grow and blossom. And so what I'm going to do is just summarize a few of the submissions that you guys have all made during this session.

So the first one is-- you may recall because there were a lot of questions, was just after Kevin laid out the initial vision, did you get it? How did this land on you? And I think it's a resounding yes. So nice job Kevin. I think as you look at this, I think people got the idea that this is around partnership. This is around collaboration between PG&E and lots of other groups to better manage forests, healthier forests and sustainable value streams.

Some of it is high level. It's also looking at some of the specific seeds you planted and talked about later around the woody biomass and the forest materials after the treatment is done. So that was really good. And then I think the next one is, did anything surprise you?

So I'm going to point to number two. I'll just read it out loud because I fully agree. Kevin's genius warrants permanent resourcing to drive transformative forest initiatives. So nice work, I don't who did that.

Great job. Without comment. Thank you.

Worth acknowledging. We have a concept at PG&E that we've really been leaning into around breakthrough thinking, thinking differently for big breakthrough outcomes. That's really what this is. So, you see groundbreaking disruption. And then a nod up top to the potential for controlled burns as an effective mitigation strategy, so some good examples there.

So did anything confuse you? Sometimes Kevin talks really fast. So I ask him to go back and say it again, make sure I got it. So was there anything confusing, concerning or excitement? And I think there was a mix here. On the one hand, strong excitement, enthusiasm for this work, for PG&E actually partnering outside of our system, outside of our operations for the greater good. I think that that's inspirational. And just this idea of fire adapted landscapes, thinking at that landscape level is really important.

At the same time, there's a lot of questions here. How do we pay for this? What is the appropriate level of cost allocation between PG&E and our customers, versus the state, versus other fundings? And I think we've laid the groundwork for some possibilities to do that. As well as the process, how does this actually work?

And as Kevin laid out, one of the slides was that process that we are actually following right now. We have pilots underway. We announced a number of them in June and that continues to grow. So we're building a standard for how to do this. But I think there's a lot of openness to figuring out the right way to do it.

Anything surprising along those lines? I think some similar themes just around this as a strategic pivot, as another layer of protection for PG&E's wildfire mitigation strategy. We continue to add new tools in the toolbox. And so this is an opportunity there. But also the cost, how do we fund this in a sustainable way and get beyond that pilot scale to the larger scale?

And so while we continue to demonstrate the opportunity thinking longer term, how does it become more sustainable? And then working through some of the details, like permitting. When you start getting at the local level, is it on public land? Is it on private land? It can get complicated, or if you're thinking about a controlled burn. And so I think that's important to do it the right way. But also is there a more efficient way to build and scale the projects?

As you may remember, Kevin got into the targeting. Where do we do this work? And what's the potential for AI to help? And it's broken down by different groups. And so just at a high level, as I looked at this for the utility workers, the people. And I think our contractors that are doing this work, there's a real cost theme here. How do we utilize the resources that we have in the most effective way to deliver the outcomes that we're seeking, could it be analyzing budgets, benefits per dollar? That sort of thing, for how we allocate the resources.

And then on the external partners, a lot of this got into the information, the data that we have about areas that others have. How can we pool the information that the state has that different partners have? So you have a more of a view, a database for collaboration, which is something we're doing, it's interesting this came up. And then even getting more specific about the vegetation on the ground or how to partner with educational institutions, fire agencies, others for training, because there's new workforce development skills here as we build this muscle.

And then thinking ahead, there was a couple of suggestions in here around distributed energy resources and how there may be a role for that, which is something I think we would need to think about, as well as training and communication and coordination. As well as just the opportunity to partner with the local institutions, educational institutions here in the state.

And then value stacking, I'm so glad that Kevin put this in here, because on the one hand, there's a strong wildfire risk reduction potential. But there's all these other potential benefits, including protecting our natural environment and sequestering carbon for the state's goals. And so I think, a lot of what I saw here was how do we make this actionable and move from the concepts into the implementation and learn as we go.

That's it.

Is that the last one? And yeah. So I think we're well on our way. And it was great to see the feedback here because I think it tracks very well with how you've been thinking about this and what we're actually trying to do, which is exciting.

Yeah, very thoughtful comments, thank you. We have a minute and 20 seconds for questions if anyone has any.

You actually have less [INAUDIBLE] the closing remarks. We'll be streaming it here.

OK, closing remarks. Find me afterwards at the Happy Hour if you want to ask questions or talk more. I obviously can talk about this all day, and love it. And it's going to take a village. So let's keep building the village. And then last, I think I had some planted remarks that you are to stay in your seats, because we're going to have a voice come to you from the screen, who's going to provide instructions as to what we're supposed to do next.