Charging Ahead: PG&E Tony Earley

https://www.climateone.org/audio/charging-ahead-pge-tony-earley
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Greg Dalton: Advertisements for solar panels on AM Sports Radio aimed at Joe Sixpack are a sure sign that sun power is going mainstream. And the sales pitch is working, half of American homes with solar roofs are in California and thousands more are added each week. California sunshine will grow even more powerful under Governor Brown's plan for the state to get half of all its electricity from clean sources by 2030. The big utilities are on board but startup companies say they're trying to cast a shadow on them and some cities are scrambling to get in on the action. I'm Greg Dalton. And my guest today is Tony Earley, CEO of Pacific Gas and Electric one of the largest and cleanest power companies in America. With our live audience at the Commonwealth Club, we'll discuss California's push toward renewable energy, the outlook for coal and other fossil fuels, electric cars and what individuals can do to reduce their carbon footprint. We'll also discuss the deadly explosion in San Bruno and what PG&E is doing to improve its safety and reputation. Tony Earley took the helm at PG&E in 2011 after nearly two decades with the Detroit's power company DTE Energy where he was the chairman and CEO. He's also a former chairman of the Edison Electric Institute, the power industry's trade group. Before we begin, I should also say that PG&E is a financial supporter of the Commonwealth Club. Please welcome, Tony Earley.

[Applause]

Tony Earley: Thank you.

Greg Dalton: So welcome. I'd like to describe a day -- I went by your office yesterday, I didn't get a chance to see you.

But I went to PG&E yesterday and I saw this really interesting scene that I think captures what we're going to talk about. There was an electric car, a big solar panel, lots of information about PG&E's renewal energy. And then there's a group of a couple hundred people, some of them wearing Solar City and other, you know, solar company t-shirt saying you're not doing enough, you're trying to stomp on their business and what struck me was you agree on the direction, climate's bad, solar is good, but there seems to be some tension around cost and who pays. Let's talk about that.

Tony Earley: Yeah, it was kind of ironic that that was going on yesterday because this week we hooked up our 200,000th rooftop solar customer. So we've been making tremendous progress and in fact what you saw that we had some tables for our employees where we have incentives for our employees to sign up for a rooftop solar. So it was kind of a funny juxtaposition of the protesters and we're working to keep increasing the number of solar rooftop units we've got.

Greg Dalton: Yeah, the cops looked pretty bored. You actually agree on lots of things. But let's talk about Governor Brown has a plan, you're on board with it: 50% renewable energy in the next 15 years. How are you going to get there and are consumers going to pay more for it?

Tony Earley: Yeah, and it's a visionary plan, but it makes sense. So, the current target of 33% by 2020, all the utilities are going to make there. We're going to cross 30% this year we're 27% last year. And we've got contracts that are lined up, projects that'll get us to the target very easily. We actually would've preferred a carbon reduction target. Because the reality is what you want is to

reduce carbon however you can get there. And we had done a lot of work to show if you have a mix of renewables more energy efficiency, more electric vehicles you can probably get the optimum from a cost standpoint. But we've also done work to show we can get to 50% renewables.

May cost more than if we said, well let's do 45% but we'll do more energy efficiency. But, you know, a lot of that is projections today of what's going to happen in 2030. And the reality is if you told me, you know, five years ago that the cost of solar panels would have come down so much I would have said no, they'll just not going to do that, but it is. But I think the plan certainly is doable, it'll be a combination of solar panels, some wind and maybe new technologies that come along.

Greg Dalton: So at the heart of the debate over the cost is there's a PG&E proposal which I guess right now according to the LA Times, the average savings of a solar homeowner was about $110 a month, that would drop down to $90. So solar homeowners would save less, so why is that necessary? And industry's concerned that's going to hurt solar adoption. If you're not going to go solar, they're not going to save as much.

Tony Earley: And the key here, the issue here is paying to upgrade the grid. We've got to invest in the grid. And when you think about it, it makes sense. The grid was the basic design was early 20th Century. And it's pretty simple, and you just have big power plants, you threw power in one end and you took it out the other and any good electrical engineer could calculate the flows and the voltages and things like that. Well think about it today where you've got rooftop solar units dumping electricity in all over. You've got big solar rays and wind farms out in the desert. And by the way, they're not predictable because if a cloud goes over if it ever does rain in California again, if a cloud goes over, electric production drops and then it'll come back up. So it is a much more sophisticated system and so you need much more sophisticated monitoring and devices. But somebody is -- you got to be able to pay for that. And so a lot of this is around making solar users which actually are very large users of the grid, they're sending power out, they're taking power in. You need to have more sophisticated controls. It's making sure we've got the money to pay for upgrading the grid to a 21st Century grid.

Greg Dalton: And the other part of this is to reduce the amount of money that solar owners, homeowners get paid for the electricity that they send into the grid. Why is that necessary?

Tony Earley: Yes, so there I mean there are a couple of ways that you can have people pay for the grid. It could be a model and some utilities have proposed this where you just have a rooftop solar fee. So it's kind of like your cable fee where you'd, you know, you pay a monthly fee for your cable whether you actually use the cable or not because they've got to maintain all of their equipment. We took a slightly different approach and we said look, we're getting electricity from the customers. It costs us money to generate that electricity and we'll pay them what it costs us. Because your electric bill is really made up of two big pieces. One is the cost of the electricity, and the other is the cost to maintain the electric system out there. And so, we'll pay customers for the cost of electricity and then the differential will be they're paying for their part of the grid upgrades that have to occur to accommodate the sophisticated equipment that's on it.

Greg Dalton: Probably a smart idea not to affiliate yourself with a cable company probably the one company that consumers like less than the power company.

Tony Earley: That's why we didn't choose that model.

Greg Dalton: Yeah, great, yeah. We're like the cable company, love us more. Okay. Let's look nationally what's happening, there is a lot of, I heard executives from Sunrun Solar say there's about 40 initiatives around the country to kind of put the price or push back what solar industry says push

back on solar. So looking nationally, you headed the Edison Electric Institute, where is solar viable and where do you think that other renewables make more sense?

Tony Earley: Yeah, well, clearly California, Arizona, you know, the southwest it's very viable. There are probably some parts in the southeast although you've got a lot of rain and cloud cover there. But we're at the heart of where solar makes sense. Wind is of course the other big alternative, the upper Midwest, very strong in terms of wind. Problem that the upper Midwest has even though they can generate a huge amount of electricity they don't have as many people. So you've got to build very expensive transmission lines to get it to Chicago, Detroit, wherever you want to send it. And, while the electricity maybe cheap from the wind it costs a lot to get it to the load center.

So, I think the interesting thing is, you know, the Environmental Protection Agency is coming out with what they called a Clean Power Plan. And, while there are questions about whether they have the legal authority on the clean air act, actually their model works. They basically said each day look at the resources that we've got, look at where you are in terms of your carbon emissions and put together a plan to figure out what the best mix is and you can take into account, you know, so do what costs the least, do what you think you can do best. Put together a model and submit it to us, we'll take a look at that and give you some feedback on it.

Greg Dalton: Is this a partisan issue? In Texas there's something called Green Tea, the Tea Party that supports solar roofs, green energy. Is this a red state issue, you were in the Midwest?

Tony Earley: Is there anything that's not partisan these days? I -- in kind of one of my standard stump speeches I usually say electrons aren't blue or red. This should not be a politically partisan; it is probably a geographically partisan issue. We actually used to see that when I used to -- and I spent a lot of time in Washington on these issues. And you would find coalitions put together across party lines. I mean one of the things that's developed now is you can't do anything across party lines because, you know, just it's that difficult.

But it really is more geographic than anything else.

Greg Dalton: Let's talk about affordability. Julian Castro the Secretary of Housing was here a few months ago and noted that clean energy, renewable energy is often thought of, associated with the coastal elites, Berkeley, Boston -- Boulder not being on the coast -- but with the elites. And how can clean energy be more affordable, accessible to renters and people with lower income?

Tony Earley: Yeah, and we are looking at that through program that we're putting they are called community solar program. Because not everyone can afford solar, not everyone has a house that can handle solar. You don't have a big rooftop or you live in a multi-family dwelling. And so our concept is that we would put up small to midsize solar panels and solar rays that then customers could contract with us and say like we want renewable power. And, you know, we'll build these units and sell them to customers that otherwise couldn't afford a solar array. Or they could buy, you know, some of their requirements from renewable resources.

Greg Dalton: There's solar coops out there the idea that people going to buy a share. I talked to someone in Texas a couple weeks ago in Austin who was talking about building a big solar and you could buy in, buy a share of it and then you could kind of trade it. And if you move around, it could go with you. Could you see that kind of innovation happening in the market?

Tony Earley: Yeah, I mean I think it's really interesting. And, you know, with the proliferation of people with great ideas on applications I think we're going to see all kinds of innovations like that.

It's going to be fun.

Greg Dalton: And the smart grid, what does that mean? That's a term that gets bounced around a lot I mean the old grid is dumb, smart or trendy --

Tony Earley: Yeah, I love that because, you know, if you talk to ten people even ten people in the industry and say what's the smart grid, you'll get ten different opinions on it.

But what it really is, is using technology to make the grid more efficient and more effective in serving customers. And I'll give you a great example of this.

So, as you know in California we have quote "smart meters." And these are basically meters that have a small computer and transmitter so originally thought well, the utilities will save some money because they don't have to go out and read the meters and customers will have real-time information about how much energy they're using so they could manage their electricity usage. And that was, you know, good and it's all true and you can manage your usage in fact you can even hire somebody who writes different app and if you see a really cool app, you can send your smart grid data and they will put them into their app and tell you, you know, how you can be more efficient with electricity. But then we discovered, you know, these meters tell us a lot about the system. Back before we had them, we didn't know you were out of electricity unless you called us up. And so if there was an outage at 4:00 in the afternoon because a storm went through we didn't know til you got home and called us. Well we discovered with these meters, we know the meter tells us, "Hey, I'm out!" So we know to mobilize our -- before you even call; in fact we might even get your electricity back before you even get home.

Then we found oh we could attach that information coming from the smart meters and we could send it right to our switching gear and if there are a thousand customers out we could switch around so that only the hundred customers nearest where the failure happened are out. And so you can think of this as now the grid is getting smarter and I think we're going to see all kinds of innovations as new technologies come along to be able to make the grid smarter and faster and more efficient.

Greg Dalton: Those benefits are all on what's called the outside of the meter or the utility side of the meter. And one of the criticisms of smart meters is that it wasn't clearly articulated what they do for customers, what does it do for me inside the home. One thing is Microsoft and Google made a run at this kind of thing with a couple of efforts to allow people to understand, you know, how much energy their toaster is using, that sort of thing, those both flopped. And one of the tension points, I mean are we going to see that come back?

Tony Earley: I think so. And we have, you know, the customer, our customers have the ability if they see an application they think is cool they can send their smart meter data to them and use it for that application. And, you know, Nest is a perfect example. My old company DTE Energy has actually developed an algorithm that customers can use that can tell them -- in fact this is a neat one -- where you can go around and it'll tell you whether you're using more or less than some of your neighbors and you can actually, it's a device you can go and figure out which appliance is causing the problem. So you're going to see a proliferation of all of these things.

Greg Dalton: One of the critiques of utilities is that they're not a data company or a big industrial company and that they don't know what to do with the data.

Tony Earley: Yeah, and I think too, and one is we know we've got to hire data scientists, and we're doing that. When we go through our analysis of skill sets, we need more people who understand how to use the data. But the other is that as I said, we have the ability, our customers can send their

data to whomever they want.

Greg Dalton: And the utilities are the future; there's a lot of talk about utilities being in a death spiral, that they're challenged, that their customers are now becoming their competitors or suppliers. Is that fundamentally challenged, what's the business model of utilities?

Tony Earley: It certainly changes the business model. I don't view customers becoming competitors, they're more of partners. And the customers will decide what part of the energy chain they want to play. And do they want to be in the generation business. I don't really -- utilities don't make any money off the generation. I mean, the cost of generating electricity is just passed through to the customers, it is what it is. And so we see us as partnering with customers going forward. What we have to do then is make sure that our systems or our grid can accommodate all of these new technologies. So, our opportunities are in investing in technologies that can run the grid to accommodate all of these new technologies going.

Greg Dalton: So you're a poles and wires company rather than build a big billion dollar plant company?

Tony Earley: I think, you know, there still be some large generators on the system as I used to say when I was in Michigan you can't start a cold roll steel mill with a solar array. The laws of physics -- I mean a lot of people don't know it, if you unhooked, if you have a rooftop solar and you unhook from the grid, your air-conditioning unit wouldn't start because, you know, when your air-conditioning unit the lights flicker a little bit? Well, that's because the utility all of a sudden sending all kinds of surge power to get that motor going. Well, when you've got a solar array, the sunlight doesn't change just because you turned on your central air-conditioning unit. And it'll either your lights will dim or if you're dim enough, you burn out your whole system. And so, I don't think that -- I mean utilities are going to have to be partners in this and going to have to invest in a grid that, you know, keeps the system going. And we'll need big generators on the grid to kind of keep the momentum going.

Greg Dalton: People in San Francisco don't have air-conditioners though the way things are going they might be reaching for them pretty soon.

Tony Earley: Yeah, talk about climate change!

Greg Dalton: Yeah. I want to roll a clip we have our past guest here Hank Paulson talked about this. I want to get your response to what he says about climate as a business risk. Let's listen to Hank Paulson.

[Audio Clip]

Hank Paulson: *Climate change I think is a very difficult issue to deal with. I think the biggest risk, not just to the global ecosystem and the environment. It's the biggest economic risk we face. But we tend to deal with issues nationally when there's an immediate crisis, rather than a longer term issue.*

[End audio clip]

Greg Dalton: So that is Hank Paulson, former Secretary of the Treasury, former head of Goldman Sachs, saying that climate is the biggest business risk we face.

Tony Earley: It certainly is a very real business risk. And you look at you can look at all kinds of examples of that. I mean, so what happens to sea level? Any of you have been over to the Exploratorium in their new location up there in the observatory. They actually have a topographical

map where you can push a button and it'll tell you what happens if sea level rises one foot, two feet, I think they go up to 4 feet and show you the coastline of the bay. And it changes and a lot of places that, you know, people live and work will be underwater. So that's one example. I mean agriculture; we're finding today our agricultural customers, a year or so ago a lot of them started complaining about their electric bills were going way up. And we went out, did a lot of analysis and worked with them. Part of it is they've got to drill their wells deeper in order to and they got to pump water more often. And so they're pumping more and their pumps work harder because they got to drill deeper. I mean, so that's a business risk for them.

Greg Dalton: And how's that affect -- PG&E has a lot of hydro, we're in a drought, a lot of fires that affected electricity supply in San Francisco during the Rim Fire.

Tony Earley: Yeah, so all of you have been impacted in a normal year, we generate about 15% of our electricity from our hydro system our hydro system very efficient generally very low cost.

Last year I think we're at about 8% generation; probably be about the same this year. I think we probably spent a couple hundred million dollars last year going out and buying power on the market to replace that hydro that we couldn't generate. As I said that just gets rolled into the power cost that shows up on your bill. So people are seeing the impact already.

Greg Dalton: So what can we do, what can PG&E do to kind of prepare, be stronger to bounce back from those things?

Tony Earley: Well, you know, a number of things is with -- I talked about the agricultural customers, we're working with them on more efficient pumps and motors to minimize the impact on the hydro system itself. I mean we are looking this year at an El Niño year everyone is predicting a pretty strong El Niño which will help. Unfortunately the predictions are it'll be more rain than snowpack. And for us, our system is a very low environmental impact system. We have a number of larger dams. Most of them are run of the river, which means you just kind of scoop water off the river to run your plants. And so the storage is not a dam, the storage is the snowpack and without the snowpack you're not going to be able to generate it. So you make up for that. We'll be working with our solar providers and contracting for more solar projects going forward to get the right mix.

Greg Dalton: If you're just joining us our guest today at Climate One at the Commonwealth Club is Tony Earley, the chairman and CEO of PG&E. I'm Greg Dalton.

And it's time for our lightning round, a series of brief yes or no questions for Tony Earley. The first one is: Julia Roberts did a fabulous job playing Erin Brockovich in the movie about contaminated water and the California community, yes or no?

Tony Earley: Yes.

[Laughter]

And when I arrived here four years ago and I sat in a meeting and people are talking about dealing with that issue, and I go, when was that movie made? Why are we still dealing with it? But we're actually making some good progress there.

Greg Dalton: Hinkley was quite a while ago.

Tony Earley: Yeah.

Greg Dalton: Next question, California's laws favoring clean energy over fossil fuels have helped

generate new jobs in technologies?

Tony Earley: Yeah, absolutely.

Greg Dalton: Autonomous cars are cool and a little unnerving?

Tony Earley: Having been in one, yes.

Greg Dalton: And Tony Earley, as I said -- Tony Earley is on the board of Ford Motor Company and we'll talk about personal mobility in a little bit. Alright, you support Governor Brown's goal of reducing petroleum use in California as part of the state's climate action plan?

Tony Earley: We support reduction in carbon and we think electric vehicles have to be part of that. So yeah, have to be reduction in gasoline use.

Greg Dalton: Tesla has a hot bod.

Tony Earley: They have a cool car.

[Laughter]

Greg Dalton: Your predecessor, Peter Darbee was a champion of clean energy and he showed leadership by taking PG&E out of the US Chamber of Commerce in 2009 because it opposes action on climate.

Tony Earley: He did, yes he did that.

[Laughter]

Greg Dalton: Do you think that PG&E, do you wish you were a part of the US Chamber of Commerce?

Tony Earley: You've got to -- they are a player in Washington and we deal with them and work with them. We work with a whole bunch of other thing. This whole thing about, well, because one thing you're not going to play ball with them, that's the problem. But you got to work together, these are hard issues.

Greg Dalton: You are still working to repair the damage to the company's reputation caused by Peter Darbee's tenure as CEO?

Tony Earley: Yes.

Greg Dalton: The California Public Utilities Commission under former President Mike Peevey got a little too cozy with utilities it regulated.

Tony Earley: Boy, that's [Laughs] can I take the fifth on that one? I mean there were issues on both sides that really needed to be fixed.

Greg Dalton: The fact that burning fossil fuels is disrupting the climate is an accepted fact in most corporate board rooms.

Tony Earley: I think we're getting to a tipping point where I would say yes to that.

Greg Dalton: Even in the good old boys in the coal industry and in the utility industry.

Tony Earley: In the utility industry, yeah, I can't talk, speak for the coal industry as such but it's clearly is true in our industry.

Greg Dalton: Certainly the biggest corporations, Ford, Walmart, General Electric there's no dispute that it's happening.

Tony Earley: And even the traditional big coal burning utilities. My old company DTE, and Southern Company just is in the process of buying a natural gas company because they want to phase out their coal plants. They also gotten very heavily into the renewable space, so people are saying we got to change.

Greg Dalton: Fracking for natural gas may have serious impacts on water quality and human health.

Tony Earley: No, not if you drill the wells right.

Greg Dalton: There was a Johns Hopkins study recently that found a correlation not a causation but a correlation between premature birth and proximity to drilling operations looking at 10,000 pregnancies in Pennsylvania. Before the San Bruno explosion, PG&E should not have diverted funds for gas pipelines safety to pay executive bonuses?

Tony Earley: That just didn't happen. I mean, you could question whether the company over the years had invested the right amount in their pipeline business as the same way you question did the public utility commission give the company enough money in their rates, but it had nothing to do with executive bonuses.

Greg Dalton: The Utility Commission President Mike Picker made that comment. California is replacing Michigan as the center of innovation in the auto industry?

Tony Earley: I think we're seeing interesting synergy. So you're right, I think every automaker is in Silicon Valley. Many technology companies have moved to Detroit. In fact, the downtown Detroit area is booming with technology companies because your car is a rolling computer. There's more value in the electronics and computers in your car than there is in steel.

Greg Dalton: There was a New York Times story recently that said, how many millions of lines of code there is in a car and it's more than all of Facebook. There's more lines of code in a new modern car than all of Facebook, so it is a hugely complicated --

Tony Earley: Huge, yeah.

Greg Dalton: Last one. In your heart Tony Earley, you were rooting for the Detroit Tigers when they played the San Francisco Giants in the 2012 World Series?

Tony Earley: Yes, I was.

[Laughter]

Greg Dalton: Alright. How did he do? I think he did pretty well. That's the end of our lightning round with Tony Earley.

[Applause]

[Climate One Minute]

Announcer: *And now, here's a Climate One Minute.*

Tech companies like Apple and Google have spent plenty of time and money to get your loyalty. But beyond making sure the lights come on, your local power company has never had to do much to keep your business. David Crane of NRG Energy says that dynamic is changing – thanks to a new era of consumer choice:

David Crane: *For the longest time people have had no choice of where their energy comes from. Historically it's a state granted monopoly. And the fact about monopolies is, if your customers have been given to you and no one has a right to compete, you don't really, you know, prioritize giving them what they want. And it's been an article of faith in the American energy industry that whatever we can produce, the American public will consume. So we don't have to stimulate demand, we don't have to care, we just have to produce it. And for a variety of reasons -- the gas boom, you know, the unconventional fracking, the dramatic reduction in the cost of renewable energy -- we now actually live in the world of energy abundance. And when you have abundant supply, people should be able to make decisions about where they want their energy to come from.*

Announcer: *That was David Crane, CEO of NRG, speaking with Climate One in 2014. Now, back to Greg Dalton and his guest Tony Earley at The Commonwealth Club.*

[End Climate One Minute]

Greg Dalton: Staying true. Let's stay with the cars because Apple is reportedly coming into the car industry. This industry that was kind of shrinking, almost dying, six years ago. Google is doing autonomous cars; it's a very exciting time. You're on the board of Ford Motor Company, where is this going?

Tony Earley: Yeah, it is kind of ironic. I joined the board of Ford in early 2009 which of course was just a disastrous time. If you'd told me then you're going to have everyone in Silicon Valley wants to be a carmaker, I would have said you're absolutely nuts. But it is very exciting because I mean, the American desire to be mobile and to get around and they love their cars, marrying that up with technology, I mean we're going to see some tremendous changes. And couple years ago I thought, yeah you know this whole thing about autonomous cars isn't going up but everybody's working on it.

Greg Dalton: Another innovation is Lyft and Uber. Bill Ford actually invested in Lyft. If people -- does that challenge the industry, when people don't need to rent a piece of metal that they -- it depreciates in their garage and sits around idle most of the time when they can just tap their thumb and hitch a ride?

Tony Earley: I think it challenges it in a way that the industry has to think about it's not going to grow a million units a year. And it's amazing, I mean this year will probably be a record year or close to it in the auto industry in the US almost 18 million units, up from, you know, in the depths of the recession was probably 12 million units, so amazing rebound. The Chinese are now at 28 million units. But what I think we're going to see is those growth numbers will start to flatten because cars when think about it are very inefficient.

I think the average American drives about, they spent about an hour and a half in their car a day so the other 22 1/2 hours it's just idle. And like any business if you can figure out ways to more efficiently use the product that's good for the economy in the long-term. Now for the automakers the technology that's going in, these cars will be far more valuable.

Greg Dalton: If you're just joining us, we're talking with Tony Earley, Chairman and CEO of PG&E. This is Climate One from the Commonwealth Club. I'm Greg Dalton.

So what does that mean for electric vehicles? Ford seems to have not placed as much of a bet on electric vehicles; it kind of doubled down on the internal combustion engine with the eco boost, which is a turbocharged engine. Some other companies have placed bigger bets on electrics. How do you see, are they going to be a niche or electrics going to be mainstream?

Tony Earley: You know, in fact Ford has three or four electric models that have been very successful. I'll tell you a quick story. So we did an incentive for our employees to buy electric vehicles because we think if our employees aren't out there driving them, why should anyone else? And I worked with both GM and Ford and the deal we cut was if you give us the employee discount that you give your employees for 30 days we'll match it and offer Ford and GM products. Between Volts, Ford Focus electrics and Ford plug-in C-Maxes, we sold over 700 vehicles to our employees to the point where every Ford C-Max or every Ford Focus west of the Rockies had been bought up by a PG&E employee.

Greg Dalton: Is there a future for hydrogen or is that the fuel of the future and it always will be?

Tony Earley: And always will be. You're talking to Bill Ford weren't you? It's a challenge and I was a co-founding director of a fuel-cell company called Plug Power, back in 1997. We co-founded it with General Electric. And it's just really hard; it's one of these technologies that's hard to move along.

And then you think about the infrastructure. You know, people complain that there aren't enough plug-in stations for electric vehicles today. And yet you can go home in your garage and just use your 110 outlet. I charge my C-Max in a 110 outlet in the garage in our apartment building. But if you have a hydrogen vehicle, I think there are 12 hydrogen filling stations in the state of California. While I'd like to think hydrogen is going to be very helpful, it's I think a long time off because that infrastructure piece is hard.

Greg Dalton: Electrics are here and now; the New York Times had a story recently about plug rage, that there is not enough plugs for drivers to plug-in and people are yanking their plugs out and getting in scuffles and there is a plug-in etiquette kit where they get tags you can put on someone's -- plug in my car, these sorts of stuff which says there's not enough charging as an EV driver I find there's enough for our Nissan Leaf. What are you going to do to make charging more accessible so EV's can continue to drive?

Tony Earley: Well, after we sold the 700 vehicles to our employees then we had to have a program to install another couple hundred charging stations around our system. But statewide we really need to have a big push for charging. All three major utilities in the state -- ourselves, SoCal Edison, San Diego Gas & Electric have proposals in front of the Public Utility Commission to significantly up the availability of charging stations.

So we've proposed that over the next five years we'll install 25,000 charging stations in the Northern and Central California. Now that still estimate is only about a quarter of what the market will actually need, but it certainly will be a lot better than where we are now.

Greg Dalton: NRG is an independent energy company, actually one of your large suppliers; they're trying to have their own system for charging systems. They think that there's some debate about who should pay for those chargers and if you do it, will people who don't drive EVs be subsidizing the EV Tesla drivers.

Tony Earley: Yes, I look at that, the charging stations ought to be part of our grid infrastructure. It's like saying well people who have smaller houses are subsidizing people with larger houses that need a larger transformer on their circuit. I mean it's just part of how you build a circuit. And so I think that as we modernize the grid part of the modernization not only is putting new high-tech monitoring devices, but we are to be putting if we're building or rebuilding a circuit in a commercial area, we just ought to put the infrastructure for charging stations there. It's not a matter of subsidy, it's -- that's what a 21st-century grid ought to look like.

Greg Dalton: And who should pay for the juice and how much?

Tony Earley: Well, everyone who uses the grid, and in fact the interesting thing is although today the charging stations are to give electricity to the vehicle owners. In the future, it may be the vehicle owners giving electricity back to everyone on the grid.

Greg Dalton: The vehicle to grid, the idea that their battery when it's hot, you can grab power from someone's electric car rather than turning out a 30 --

Tony Earley: Yeah, to knock down the peak if they're not driving the car.

Greg Dalton: Because those peak plants are dirty and they're expensive. Diablo Canyon Nuclear Power Plant is the last one in the state, 50 years of nuclear in California. Rancho Seco was shut down. San Onofre was shut down. You've applied to re-license Diablo Canyon. You're going to keep running it?

Tony Earley: Well, when you think about it -- so here's a state that is really concerned about carbon emissions and we've got a plant that produces 2,200 megawatts which is a large amount; 2,200 megawatts of carbon free electricity. From a big picture standpoint, it makes absolute sense. Now there are a lot of things that have to be done. The plants are licensed through 2024 and 2025. We're obviously behind the scenes working on what needs to be done. We'd actually submitted an application before the Fukushima earthquake. It was put on hold. The NRC has since now re-opening that proceeding, you know, and we haven't made a formal decision yet about whether we're going to throw all our resources behind it. We don't need to make that decision right away. But, you know, when I think about it, it makes sense to keep carbon free electricity in California.

Greg Dalton: It's an ocean front facility so there's a tsunami risk. It's near an earthquake fault. Could a Fukushima happen at San Onofre?

Tony Earley: Well, in terms of the tsunami, it's way high up on a bluff, we've done all the -- tsunami risk is not a risk. Earthquake? Yes. And in fact there was a big earthquake in Virginia about four years ago. And every nuclear plant in the US had to go relook at all of their seismic analysis. As it turns out the California plants actually have a lot of safety margin because we knew we were near seismic risk, whereas a lot of the eastern plans have a smaller safety margin. They all pass, but at a smaller safety margin because they weren't designed that way. And even though new faults have come up, one of the things the NRC is looked at is, so are these new faults, do they change your thinking about the design. And all of their studies so far say no, this is pretty robustly designed.

Greg Dalton: Will we see a nuclear renaissance in the United States? There's what, five plants under construction now. It is carbon free, but they are very expensive. The cost of other energy has gone down; cost of nuclear is going up.

Tony Earley: We've seen the, you know, future of nuclear changed a lot. Early on in my career I actually started in nuclear submarines in the Navy. And then went on to those licensing plants when

there were licensing plants all over, then they stopped. Then it there was talk a couple years ago about nuclear renaissance. Reality is a lot of Americans on, there are five nuclear plants under construction in the US right now, two in Georgia, two in South Carolina, one in Tennessee. They are very expensive to build up front. We're talking $8 billion, $10 billion a copy. And yet, once you get it built, they're carbon free and they're pretty inexpensive actually to run it daily. Uranium prices are very low and they're not particularly volatile. So I don't see that you'll see a nuclear renaissance. I think in those states that still have a regulated electric business where they can take a longer view and not depending upon what the market price for electricity is next week or the week after that, you'll see plants dribble out, but I don't see you think you can see a major construction site and it's unfortunate. The Chinese are right now building at least a dozen plants and every year they bring 5, 6, 7 plants on line.

Greg Dalton: The fact that they don't -- did I hear you say they really can't compete in an open marketplace? They have to be in a kind of a regulated cage where the regulator is kind of--

Tony Earley: Well, you have a long time because these are 40 to 60 year assets. And so if you figure okay, here's what it's going to cost to run the plant for 60 years and we'll charge, you know, and so you can think it's like amortizing your mortgage, and if you have that kind of environment. But if you depend upon, well I'm only going to get this much this year and I'll get enough next year and then it'll drop back down.

It's hard, I mean it's like your banker wouldn't give you a mortgage if they don't know what your income is going to be in any particular year.

Greg Dalton: If you're just joining us, we are talking at Climate One today with Tony Earley, CEO and Chairman of PG&E. I'm Greg Dalton. You can listen to podcasts of this and other programs on the Climate One website.

Let's talk about San Bruno; $1.6 billion fine for the deadly gas explosion there. Federal regulators said it was a flawed pipe, flawed operations and flawed oversight and there's been some criticisms, even since then of what PG&E has been doing. So what are you doing to restore trust and faith?

Tony Earley: I mean it was a huge tragedy; eight people lost their lives there. Since that time, company has invested billions of dollars in upgrading its natural gas system. And we're still not done with it, this is a huge system; we got 7,000 miles of high-pressure gas pipeline, tens of thousands of miles of local distribution alliance. I mean, we have pressure tested hundreds of miles of pipe, we've replaced pipe. One of the key things we've done is lot of the pipe was installed so that the San Bruno pipe was installed in the 1950s. Back then they didn't have these remote tech now, we now have equipment and you can think of this as remote cameras that you can put in the pipes and go through it and inspect it, x-ray it. Get all kinds of data that gets fed back to you so you know the condition of the pipes. But pipelines that were built in the 50s and 60s aren't designed to take these pieces of equipment, so they've got very tight turns, or they got changes in diameter. So we're actually going in and fixing some of that so that we can remotely inspect large parts of that pipe. But, you know, were not done; it's going to take a number of years to do that. And we know that short of going and digging up every foot of pipe that's in the ground, you'll never know. We're doing the best we can to give the best assurance that this system is the safest in the US. And one of the measures of that is there is an international standard, it's actually two standards. ISO 55001 and there's one called the publicly available standard which is used more in Europe. And we had an outside group called Lloyd's Register that comes and looks at a company system for safety. And certified us under these standards, which was a big milestone because if you told me when I got here a year after San Bruno occurred that within three years we'd get the certification, I would have said no, not going to happen. But we were able do that.

Greg Dalton: San Francisco next year will have a choice; CleanPowerSF is going to offer a choice to San Franciscans like people in Marin and Sonoma increasingly around the state. Do you support that choice or do you oppose CleanPowerSF?

Tony Earley: Our position there is we just need customers to understand what choices they are making. And so, you know, what the power sources for other, what the relative costs are. In a weird way, there is a limitation -- we're really not even allowed to market ourselves versus others. So I see one of my lawyers down here looking at me going --

Greg Dalton: And that rule was put in place because PG&E tried to get a statewide ballot initiative.

Tony Earley: Actually the rule was put in place like before that.

Greg Dalton: Before 2016?

Tony Earley: Yeah, that was a different issue. But, the -- but again I go back to what I said: we don't need to be in the generation business. So if you want to buy from someone else you can buy from someone else. Because those aggregators like Marin, they still use our wires and pay the fees to use the wires, so we're kind of neutral. I just think customers ought to be told what it's going to cost, is it really cleaner or not cleaner power.

Greg Dalton: We're going to go to our audience questions in just a minute. I want to ask you, what kind of cool technologies you see out there that are really exciting. We talked a little bit about smart homes, autonomous vehicles. What else is out there that you think could really change the way we power our connected lives?

Tony Earley: Well, yeah, autonomous vehicle is I think one of the ways we can do that. From our standpoint, the understanding we have of the system. So we call it a self-healing grid. I talked a little bit about taking the data from our smart meters but now we're developing technologies that basically we don't have to send crews out there. It'll largely fix itself and that's kind of cool technology. Even things -- so this summer we've had the wildfires. We got some really cool technology. It's called Lidar, so it's laser radar that we can fly over all of our lines. And not only tell whether there any trees that are lying on the lines or too close to the lines. You can actually tell by the amount of photosynthesis in the trees whether it's a healthy tree or not. And it matters because normally trees that fall down into your wires are dying trees, so you want to know which ones are healthy. And you can just fly over our system and go, okay we got to get that tree, that tree, it's pretty cool technology.

Greg Dalton: We're talking about the future of power with Tony Earley, Chairman and CEO of PG&E. I'm Greg Dalton. We're going to go to our audience questions and invite your participation. Welcome to Climate One.

Male Participant: My concern goes to San Bruno. I remember seeing you and hearing you talk about how apologies, and we're going to do the best we can, we're going to make sure everything is done as right as it can possibly be. And then on the financial pages, the news pages, I see about where the attorneys and the accountants are trying to back off everything. Save, you know, save every bit of money for PG&E. Reduce the tax liabilities under the fines and all kinds of other things.

Question is, which is really the truth? We're going to do everything best, or it's the same old business of our bottom line?

Tony Earley: Yeah, I think the truth is we got great employees; we're committed to doing the right thing. And in fact, an amazing story that a lot of people don't recognize - so post San Bruno

obviously there are a lot of people were hurt, people lost their houses. Every single one of those victims were compensated in under three years. And the judge in fact, at the hearing where he approved all of the payments for individuals, said he's never seen a case as complex as this settled in that period of time. And part of it was the company just said, look, we are responsible for it, we'll step up and we'll settle these cases with the victims. So we've been committed to doing the right thing.

Greg Dalton: You're going to challenge the $1.6 billion fine?

Tony Earley: No, we just -- no, we're not appealing that. And it's not all a fine, a lot of it is okay, you just need to do work on your system. And, you know, not charge the customers for it and we're doing that as well.

Greg Dalton: Next question. Welcome to Climate One.

Female Participant: Hi, thank you. I've read that there's a land subsidence from the fracking and from the collapsing of aquifers from the well drilling that people are doing in the valley especially. How is that and also earthquakes, how would that affect the infrastructures especially like pipelines?

Tony Earley: Yeah, any kind of change in the underground structure, you know, is a concern. I am not aware of any hydraulic fracturing going on near our pipelines. And we monitor our rights-of-way pipelines and we look at what people are doing whether it's excavation or fracturing. I am not aware of it. It could impact it, earthquakes, one of our concerns has been in earthquakes, you're going to have movement of pipes. So we've installed lots of automated valves so you can shut off the pipes faster. But, you know, ground movement can have an impact.

Greg Dalton: Next question. Welcome.

Male Participant: One of the obstacles to reducing peak load is that it generally costs everybody the same amount of money to get a certain amount of power at any time of the day. So there's no incentive to run your pool heater or your dishwasher at a different time. PG&E introduced the smart rate program in order to allow people to change the rate they pay based on what the load is at that time. But it dramatically dropped off in terms of new sign ups in the past year versus 2013. Is that a sign that the public is not engaged on this issue and how can we get more people to become engaged with it?

Tony Earley: Yeah, we will be launching into a major effort on time of use rates. And in fact you'll see it between now and 2018 ramping up different sectors. Commercial sector, residential sector and there will be a big push on for time of use rates.

The interesting thing is that, you know, traditionally time of use was at night you wanted people to use electricity and during the day and particularly in the afternoon's not to use it. One of the things that we're studying is what is the peak load period? Because these days with all of the solar out there we actually have excess electricity during the day. And we may want to shift the time of use rates so that maybe during the day you get lower rates. At night when the sun isn't out, it may be more expensive to generate electricity. So, it's going to be a very interesting time.

Greg Dalton: What are the top three things that an average consumer can do at their home to reduce their energy use, smart things?

Tony Earley: Well, whenever you buy an appliance make sure it's an energy efficient appliance. Have your kids turn off the lights at the house, you know. And if you're in the Central Valley where

you have air conditioning, it's insulating the house and making sure you have an efficient air conditioning because that drives the $500 bills in the Central Valley.

As I said earlier, energy efficiency is the best thing you can focus on. It's the most cost-effective thing, so do one of those energy audits and then go through the checklist and insulate the house. Patch up holes, do the things that are recommended because they're relatively cheap and they will save you a lot of money.

Greg Dalton: Next question.

Male Participant: Thank you. You referred to nuclear power as renewable or clean energy, meaning no greenhouse gases. But it takes enormous amounts of concrete to build these plants and concrete is the development of concrete is a huge carbon dioxide emitter. So do you take into account the whole lifecycle of greenhouse gases when you consider building a nuclear power plant?

Tony Earley: Well, I think if you were going to build a new plant you do that analysis. But once the plants already built it's there. So when I say it's clean it's built and, you know, it's delivering electricity without any additional greenhouse gases.

Greg Dalton: Welcome to Climate One. We're talking with Tony Earley from PG&E.

Female Participant: Given that the average state has a D-minus rating for their grid quality, how much would it take to get California's grid up to 21st century standards and what percentage of that would be raised through PG&E's net metering and fees proposal?

Tony Earley: So I take issue, I mean, some people say that we don't have a 21st century grid, that it's a third world grid. We have the best grid in the world and I will argue with anyone around that. Now it's not the grid we need to accommodate all the technology out there. So all these people say well, we've got a third -- third world countries would kill for a grid like ours. And those of you who ever travel overseas, and particularly to developing countries know that. But we have a new technologies are coming around every day and that's why we need to make sure the resources are there so that we can continue to upgrade the grid to account for all the new technologies that we're going need to drive off that grid.

Think of it as the internet. When the internet first started, it was a couple of scientists sending their technical papers back and forth. It was pretty simple. And remember the dial-up modems that we used to have? And think about where it is today. Everything can be done on the internet. But think of how much companies like Cisco and others had to invest in the infrastructure to support that. And that's what we need to be doing over the next 20 years is continuing to invest in the infrastructure. And if we don't 20 years from now we're going to say what were those guys back in 2015 thinking and why weren't they investing in that?

And so my advice is do it in pieces. Start today and start investing over a long period of time because otherwise you're going to have sticker shock. And like anything else if you have sticker shock, you're going to have backlash and then we're going to be bogged down and not make the investments that we need to make to be successful.

Greg Dalton: Welcome to Climate One.

Male Participant: Hi. So you talked about how the price of PV panels has really plummeted in the last few years. Something else that has dropped dramatically is battery cost, and specifically home battery storage and Tesla as you probably know came out with a home battery installation. And the case of Hawaii is interesting in that the utilities there started putting more regulations on rooftop

solar. And my understanding there's a lot of homeowners in Hawaii just disconnected from the grid. I'm curious if you see that as a threat, given that you have stated you see yourself more as a transmission utility instead of an energy creation utility.

Tony Earley: Yes. So where battery pricing is today, it's not really viable.

Now Hawaii has very high electric rates because up until recently, very dependent on imported oil and so battery storage became more feasible. Here in California, we actually have a request for proposals out there for proposals on batteries on our system; we're evaluating the bids right now. And we're going to be installing batteries. But I will tell you the numbers that we're getting not many people would want pay that to have a battery big enough to supply your house and go off the grid completely. And what you use the battery for is to knock down your peak demand rather than being able to supply your load all the time. So you're going to see batteries are going to be part of this technology mix.

Greg Dalton: Let's have our next question for Tony Earley at Climate One.

Male Participant: Hi Tony, Raul here. My question is regarding batteries again particularly related to grid scale storage. Swiss company Alevo claims that their factory in Concord can generate 16.2 gigawatt power of electricity saving $12 billion a year for the companies and also Tesla's factory. So how seriously are we considering the possibility of using this grid scale storage to save money for the end consumer?

Tony Earley: Yeah, our request for battery proposals included a request it could be grid scale, it can be our circuit scale so just locally or it could be customer scale so individual houses. And we're going to be evaluating those technologies and it doesn't -- that doesn't sound for me that they bid in our proposal, I'm not sure why they didn't bid in it if they've got a great technology. Because we're looking for all different -- because quite honestly none of us know which technology is going to work. I mean it's kind of VHS versus Beta, nobody knew back then and, you know, we still don't know which battery technology is really going to be the best.

Greg Dalton: Some investors say that microgrids are a technology that could get California to a 100%, do you think microgrids can work and can California get to a 100% renewable in the foreseeable future?

Tony Earley: Microgrids are an interesting concept. The funny thing was back, one of the first big black outs was in 1966 in New York City. I remember that because I was about ready to go to a college fair, I was in high school. And the reason they had it was each state was its own "microgrid." States weren't interconnected with each other. And then after that there was a big push to interconnect the US and now microgrids are going back the other way. Micro grids, are probably going to be a -- you're going to want to have them interconnected because if your microgrid breaks, you want to get electricity from the one next to you. But they do provide you some protection from cyber issues, physical security issues and there may be a way to incorporate more renewables on it but, you know, we're all still working on how that'll play out.

Greg Dalton: Let's get to our last question for Tony Earley.

Male Participant: Good evening Tony. With community choice aggregates proving to be less dirty ways to generate power, and PG&E wanting to be more of a transmission company rather than a producer of power, how are you promoting CCAs specifically within the California Senate which there are repeatedly battles against CCAs?

Greg Dalton: CCA is Community Choice Aggregation where communities can get in the solar -- the energy business. They compete, offer a choice to PG&E.

Tony Earley: So I mean we are neither promoting nor opposing; they are what they are. We are certainly the cleanest investor-owned utility in the US. There may be some like Bonneville Power Authority and others that are cleaner. And even though we may not be building new generation we've got to buy generation from clean sources. And what we normally do is we go out and we contract with the developer of a solar farm or a wind farm. So we know that we're actually getting clean power. And we're actually creating jobs because we're signing a 15 or 20-year contract and then they go out and use that to build the plant. And so that's what we'll see in the future; as we up our amount of renewables, we'll be signing more contracts that people then can take to the bank and finance these projects.

Greg Dalton: We have to end it there. Our thanks to Tony Earley, Chairman and CEO of Pacific Gas and Electric for talking about powering California's future here at Climate One. I'm Greg Dalton. Thanks to our audience here at the Commonwealth Club and online and on-air. We'll see you next time.

[Applause]

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