

PG&E 2015 Electric Reliability Report Public Meeting

The title of the video is PG&E Electric Reliability Report Public Meeting. This video takes place in Bakersfield, California, in a hotel conference room. There are multiple presentation slides on easels at the front of the room. There is also a screen with images from a PowerPoint presentation projected onto it. There are about seven audience members sitting in chairs, listening to the presentation. As the speakers talk, they occasionally refer to the changing PowerPoint Images on the projection screen at the front of the room.

The first speaker, Matt Nauman, is a friendly looking heavy-set man in his fifties wearing a solid blue PG&E shirt.

Matt Nauman our first presenter returns to take the mic to conclude the meeting.

- Hello, everyone, my name is Matt Nauman with PG&E. I'm based up in the Bay Area, but I'm very happy to be down here in Bakersfield with my friends and colleagues and our customers today. Thanks for joining us on our Electric Reliability presentation. We have folks in the room here, obviously in Bakersfield and we also have WebEx, so we have folks listening in. If I can ask the folks on the phone to mute, we will have questions at the end of our presentation, but if you can mute yourself, I'd appreciate that. Also, if you're clicking in, click on the button that says Tiffany Refuerzo and that way you'll get the powerpoint and it'll be pointed in the right direction. So, let's start off with safety, something we always do, PG&E. If you're on the phone, obviously, assess your situation, make sure you know what you need to know to be safe. Here in the room, a couple of things here in the hotel, if we need to evacuate, we would just go out through the doors of the room and down through the double glass doors at the end of the hall, we'll assemble in the parking lot. We have sign-in sheets, so I'll ask Katy Allen to grab those to make sure that everybody is accounted for. Here at the Four Points Sheraton, they do have a defibrillator in the lobby if we, unfortunately, need something like that, it is available to us in the lobby. A lot of the PG&E are CPR qualified, so we have good support with that. Let me turn it over to Denise Newton who will kick off our presentation on reliability.

This next speaker, Denise Newton, is an attractive woman in her forties with blonde hair and a black blazer.

- Thank you very much, Matt. Good afternoon, my name is Denise Newton and I'm a senior manager here for Bakersfield. My focus is on local customer experience and I work with a local leadership team on process improvements and determining and talking about how do we better show up as a group, how do we better show up in Kern County? So, a little bit about the agenda and what we're gonna talk about today. We're obviously gonna talk a little bit about the

electric system. We're gonna talk a little bit about power outages and interruptions, what causes them, and what are we doing to help prevent power outages or your lights to go off during the day and during the evening. We're also looking at system-wide and local reliability statistics as well as what we're doing in our community and on our system to continuously improve reliability to keep your lights on and your power on, and then we'll have some time for questions at the very end. So, we've been energizing California for over 150 years. This is just a few statistics. We serve over 16 million people and we have 70,000 square miles. So basically, we're at the tail end of our service territory and we go all the way up to the Oregon border, and one of our regulators is the California Public Utility Commission. The employees here are very passionate about the community. We have over 600 employees that live and work here in Kern County and we also support this community in many ways through volunteer hours that we support the community where we go out to different organizations. If you look at the pictures at the bottom, we do a lot of safety presentations. Safety is very, very important to our organization. We want people to be safe around our equipment and our facilities, and we also give scholarships to many students. We just recently gave a Solar Suitcase Award to a student at North High School where they are going to go for eight days to Kenya to be able to take this solar technology to help the people of Kenya which is really an amazing opportunity. We have also given over \$600,000 in Kern County through the community, through charitable giving. You can see up here some of the property taxes that we pay and the franchise fees that we pay to the city and the county. Hold on, I wanted to go back. A couple of organizations that we also support here locally that's important to this community are the Boys and Girls Club. There's a dodgeball tournament that we support. There's a lot of other funds. We do a lot of internships, job shadowing. We also work with the Alzheimer's Disease Association of Kern County and many other organizations. So, public safety and communicating with our customers is very, very important, and so one of the things that we started in the past few years is letting customers know what work we're doing out in the field, whether it's electric or gas, what we're doing to support the system and to support our community, and so some of that includes leaving door hangers on their doors if we're gonna be doing work in their area. We'll call residents if their home will be impacted by an electric outage or a gas outage, but also you may be curious about different projects or work that's going on in your community, and typically, if you're near the site of the work, you're gonna receive a letter or an in-person door-to-door discussion with somebody that's gonna talk to you a little bit about why we're doing the projects. We're gonna talk a little bit about some of those today. So, I wanted to introduce now Steve Calvert and he's responsible for our reliability system-wide for PG&E, so come on up.

Steve Calvert walks to the front of the room. He is a slender man in his forties, wearing a white shirt and tie. He wears glasses and has close-cut gray hair.

- Great, thank you, Denise.

- You're welcome.

- Good afternoon, everyone. I'm pleased to be here to talk to you about PG&E's electric reliability. PG&E owns and operates over 140,000 miles of electric distribution facilities, that's about 113,000 miles overhead line as well as 28,000 miles of underground line, that constitutes about 3200 circuits across our service territory. We also operate over 18,000 miles of transmission lines. So, you might be curious where our power comes from and how it actually gets to your homes. So, PG&E gathers energy from a variety of sources as you can see on the left slide. We have company-owned generation as well as various distributed energy resources including wind, solar, nuclear, et cetera, that power is generated from around 13,000, I'm sorry, 13,000 to 25,000 volts, it's then stepped up to a higher voltage where it's transmitted to the load centers, so the middle section of the slide talks about our transmission system. You might recall, we have over 18,000 miles of transmission, constitutes 60,000 volt lines, 115,000 volt lines, two 30,000 volt lines, and then the 500 kV lines are the ones that you see up and down the Central Valley on the large transmission towers, that power is then taken into the local neighborhoods and it's stepped down at a substation to what we call distribution voltage or our distribution circuits, that's typically distributed at, most commonly, at 4 kV, 12 kV, or 21 kV. It's then taken to a transformer that might be on your street either subsurface or on a pole, and then it's stepped down to a lower voltage before the power comes into your home. So, why are there outages at PG&E? Our goal is actually not to have any outages, but there are a certain number of cases that are outside of our control. Some of the major causes of outages include weather. Last year, it's noted in our annual report, there was a number of lightning storms that struck our service territory. We do have major events, major storm events that strike as well, I'll get into those definitions in a moment. Animal-caused outages are a big driver of outages on our system, whether that's birds or squirrels et cetera. Equipment failure is a major cause. Vehicle accidents, that's either cars driving off the road. It could be agriculture equipment striking a down guy or a pole or even large trucks running into a line, so vehicle accidents are a major cause and then third-party dig-ins or construction dig-ins are another driver of our outages. So, before I get into the metrics, the way we track reliability, I want to talk a little bit about the reliability categories and how we classify various outages. Momentary outages are those outages that last less than five minutes, more often than not, they're like five to 25 seconds in duration, you might see your lights blink and then come back on, that would be classified as a momentary outages. Outages that are greater than five minutes are known as sustained outages and that's the category of outages that I'll be talking about shortly, those are longer duration outages. We also have

planned outages. Denise talked earlier about upgrades that take place on our system and replacement of facilities. We notify customers in advance, businesses as well as residential, and coordinate planned outages, so that we can do our necessary work, and then there's a category known as major events or major event days if you will. Typically, they've been averaging about six a year where it's a very unusual event and for reliability statistical purposes, those days are factored out of our reliability statistics. So, moving on, how does PG&E even know you have an outage and then how does that all roll up into our reliability system and improvement plans? On the left side of the screen, you'll see various sources of reliability data that comes to us. One is smart meter data. We have smart meters deployed across our system, they give us information on the voltage at customers' homes, whether there's a power outage, whether power's been restored as well as various other information. We get calls from customers, now that's still important part of customers notifying us. They all often tell us they heard an explosion or a line's down at a particular location, that all feeds into our response plans which I'll get into, and then we have automated systems where remote-controlled equipment that has sensors and relays in it that detect outages and immediately respond to our operating centers, so that they know when outages occurred. So, that information from all these various sources is gathered, much of it automatically, into our automated databases, although, some of it is logged manually such as the cause of an outage, that's all put into our outage systems and that translates into various industry-wide or industry-used metrics such as SAIDI, SAIFI, and CAIDI which I'll get into on the following slides. So, how do we manage reliability and once we have an outage, what's being done about it? So, the first step which all of you may be familiar with is immediate response. When an outage occurs, we have mostly typically a troubleman that's dispatched to the location where the outage was reported. They do various investigations, they evaluate the situation and then further resources are dispatched based on the severity of the outage. We have daily outage reviews which occur, most often there's a system-wide call at 8 AM where we talk about the outages that occurred the previous day, the duration of those outages, how many customers were affected, what improvements might be possible from our response in the previous day, what kinda actions we need to take to prevent outages from occurring again, so that's a system-wide call where we talk about the major events. There's also at a local level such is here in Bakersfield, we have weekly and as well as monthly meetings where we go over the outages that occurred locally, we look at repeat outages, the causes of those repeat outages, and we actually take actions such as putting up bird guards or spreading conductors or addressing any sort of deficiency in the system on an immediate turn level. I'll share with you some statistics shortly, but those statistics help drive our annual programs. So, we have annual programs of over \$200 million that we spend in upgrading electric lines, putting in distribution automation, so we can restore power faster, replacing cable, replacing transformers, installing fuses, various types of investments to limit the impact of outages when they do occur. So, I won't go through the formal definition of all these metrics that, what will tell you is the primary metrics that we use to

measure electric reliability performance are SAIDI, SAIFI, CAIDI, and MAIFI. So, SAIDI is basically the duration of power outages that a customer may experience in a given year. So, if you've had two outages a year and they were a hundred minutes each, your SAIDI would've been 200. SAIFI is the frequency, that's how often your power goes out on a sustained basis. If you had one outage during the year, your SAIFI or your interruption frequency was one. CAIDI is a measure of how good we are at restoring power after an outage occurs, so this is the average restoration time, so once the outage occurs, how quickly do we get out there and restore customers and return the system to normal, and then MAIFI is very similar to SAIFI, but it's more on a momentary basis. I talked earlier about the definition of a momentary, we also track those short outages that occur. So, how's PG&E been doing? I'm pleased to announce that last year was our seventh consecutive year of record reliability. As you can see from the charts on the page, the average duration of outage from 2010 has dropped 39%, down from 157 minutes down to 96 minutes, so significant improvement and there's even better news for the Kern district which we'll talk about shortly. From a frequency perspective, you can look at our SAIFI, again this is the number of interruptions a customer might experience, and again this is on the average, so you'll see some fractional numbers there, but we've dropped from 1.2 to .877, so that's less than one outage a year on average, and then the duration is the middle chart that we talked about, that's really how quickly we get the power back on, so we see about a 20 minute improvement in restoring customers once an outage does occur. You might ask how did we get there, how has PG&E seen such a significant improvement in reliability? Well, we made a significant number of new investments in our infrastructure, whether that's additional conductor replacement, replacing small wire, and wire with numerous splices in it. We've also deployed a lot of new technology around remote control and smart switches, so PG&E on just about 750 circuits, we have remote control capability where the smart switches will actually detect an outage, automatically reroute the power, and minimize the outage section automatically to a much smaller segment, so before a first responder is even dispatched, the system has already healed itself if you will and minimized the outage to a small segment. We have targeted programs which really look at our poor performing circuits and I'll talk about that shortly. We track the performance of all 3200 circuits across the system. We identify certain trends and we go out and we tackle various circuits every year as to what we call our worst performing or targeted circuit program, and we've also made a number of improvements in emergency response. We have a meteorology department, we track storms as they're coming in. We have a storm outage prediction model and it helps us determine where we should pre-staff our crews anticipating outages that might occur. So, how is our reliability in Kern division which is here in the Bakersfield area? I'm pleased to report that the numbers are actually even better. In the last 10 years, we've gone from 173 minutes which is 10 years down to 80 minutes last year, so that's the unplanned outages that have occurred across the system, so we've seen about 55% improvement there. You can see the numbers for yourself, from a frequency perspective, about one and half outages 10 years ago and now we're down to .87

or .862, and from a restoration perspective, you can see we've got about 20 minute improvement there and getting the lights back on faster. So, I talked earlier and this is a key part of our annual reliability report, we are required to report out on our worst performing circuits, so on the next two slides, I've identified 33 circuits, there are some duplicates, but they're selected based on the average duration of interruption over the past three years as well as the average frequency of interruption. Since we're here in Kern division, I've taken the opportunity to identify three circuits there's two on the duration page and one on the frequency page which is shown on the poor performing list. We'll also talk about what we're doing to improve the performance of these circuits. This is the frequency list as you can see. I think earlier I talked about the average customer in Kern had seen .862 interruptions per year, this particular circuit serving 358 customers saw about three times that many, 253. You'll find from the map as well as discussions later that these are rural circuits on the east and the northeast as well as the eastern part of Bakersfield. So, again, the poor performing circuits or the circuits targeted for improvement are actually shown here geographically. On the left of the screen, you'll see a system map showing the 33 circuits that were identified. Towards the bottom here, you'll see Bakersfield and three circuits identified. On the right, it's a little more specific, we've traced a portion of those circuits and the locations may actually be familiar with you as to where they're located. And more specifically, the three circuits are designated as the Poso Mountain 2101, Kern Oil 1106, and Lamont 1104. There's a brief description of where they're actually located and some of the causes of outages and what really drove their performance over the past three years. The first one, the Poso Mountain, you can see that we've had a number of animal-caused outages as well as weather-related outages on that circuit. PG&E has identified that as a poor performing circuit. As a result, we made a \$1.1 million investment in reliability on that circuit in 2014 and we're seeing improved results thus far. The Kern Oil circuit serves 668 customers. We've had a number of equipment failure events out there. The reliability team has since gone in and made some targeted improvements if you will to further sectionalize outages. One of the keys to improving reliability is that when an outage occurs, you wanna minimize the scope of outage, you wanna keep it as small as possible, so we do that through installing fuses and sectionalizing equipment to minimize the impact of customers and that impact on customers, and that's happened on the Kern Oil 1106, and then Lamont which serves 358. We've had a significant number of third-party caused accidents there, that's cars or as I talked about earlier farm equipment striking poles and thus causing outages, and we made some improvements on that circuit as well as we have other major improvements planned for 2018. So, with that, I know it was a high level of the PG&E system as well as a little bit of information around our performance here in Kern division, I'd like to hand the presentation over to Alexis Herrera and Brian To. Alexis is a project manager here for us. She leads the execution of many of our electric reliability projects here in Kern division, and I'm pleased to introduce her, Alexis?

- [Matt] Thanks, Steve. And again, just in case you joined us late on the phone, if we could ask you to mute. When we're through with the presentation, we will open it up for questions both in the room and on the phone, so I'm gonna hand it over to Brian and Alexis.

The next Speaker, Brian To, is a fit middle-aged man with dark salt and pepper hair. He wears a beige PG&E shirt and black pants.

- Thank you, Matt. Good afternoon, my name is Brian To. I am the distribution reliability supervisor for the Central Valley region which consists of Stockton division, Yosemite which is Merced, Fresno, and Kern. I reside in Stockton. However, we do have a local person as far as one person from my team, Juan Castillo, he lived and worked here in Bakersfield. He's in charge of reliability for the Bakersfield division. So, basically, this is the outline of Kern division or Bakersfield division. So, Kern division consists of 214 circuits. So, what Steve alluded earlier, we have three circuits that's on the worst performance. There are 214 circuits here in Kern division. Kern division has basically 9,165 miles and so basically, Kern division's basic cover of Kern County, obviously, San Luis Obispo County, and part of Santa Barbara County. There are five service centers in Bakersfield and the main one is located on Wible Street. Right, correct, Wible? So, as you can see, that's basically the top here, and here's our capital investment as far as in Kern County for electric distribution and transmission. In 2015, we invested \$133 plus million in Kern County and 2016, by the end of this year, we will be spending close to \$184 million and we plan to invest \$199 million in 2017 and a little bit over \$207 million in 2018. What does that consist of? Basically, upgrading substation, reconductor line, install new line overhead and underground, and also install protective equipments which Steve had talked about as far as smart technology. We talked about self-healing circuits. At this time, there are 42 self-healing circuits in Kern County and we plan to add three more for 2017. And Steve was talking about as far as reliability in Kern division as far as the minutes-wise, CAIDI and SAIFI. Here in Kern division, you see basically in 2015, there was 173.9 minutes, I'm sorry, in 2016 compared to 80.3, so it's a 50% improvement as far as within the 10 years, so we've done a lot of work and seen a lot of improvement as far as for the Kern division, and as you can see, also the SAIFI number, 1.46 in 2016 compared to .862 in 2015, so yeah, it's quite a bit reduction, so we're happy, obviously, we wanna continue to improve, so that's my team and I and Steve and his team and Alexis and her team will do everything we can in order to improve the reliability for Kern Division, so Alexis?

Brian hands the mic to Alexis Herrera. She is an energetic woman in her thirties with curly long brown hair and a midnight blue, button-down PG&E shirt.

- All right, thank you, Brian. Again, my name is Alexis Herrera and I'm a project manager here at PG&E. I cover both the Fresno and the Bakersfield areas. I've been a project manager for about eight years serving both this territory and Fresno as well. So, I wanted to highlight several projects, this is not all-inclusive, of course, we do dozens and dozens of projects in the Kern area, Bakersfield area every year, but we really wanted to highlight some of those projects today. So, the first one is the Rio Bravo 1101. This is something that we completed back in 2015. This circuit comes from a substation that's located off of Seventh Standard and this particular circuit runs north on Beach. So, this circuit experienced three sustained outages in three years. So, if you remember from what Steve explained a sustained outage is, that's over a five minute duration. So, over three years, they experienced at least three of those outages where a sustained outage. What we do then is we do a detailed patrol on that line to see what the root cause is for those outages and we discovered that in about 6,000 feet, there were numerous splices in the cable which indicated that we'd gone out and made repairs due to the damaged conductor. So, what we did is we reconductored that 6,000 feet and put in new wire, larger more stable wire. This circuit has 369 customers on it, it is predominantly residential, so our residential customers should be experiencing better reliability based on that project. The second circuit is the McFarland 1101, this is something that we actually just completed last month, so it's a recent project. This circuit is located off Elmo Highway and that particular circuit runs east down Elmo Highway. This is a very special program and Steve alluded to it when we talked about a targeted circuit. So, what we do is we take the whole main line of the circuit and this particular one was a very large circuit, it was 12 miles of main line, and we did a very detailed patrol, and instead of just focusing on the cable or the equipment, we look at everything that could be potentially causing an outage for customers. It could be trees, it could be animals, anything and everything related to what could cause an outage for a customer, and based on that, we went out and we performed work, and what they predict is that it will reduce the number of interruptions by about 74% which is pretty good, and it will also then decrease the amount of minutes that a customer would experience by about 64. This is a pretty large circuit, I believe the average is somewhere around 1800, but this one is very large, it's 2339 customers, also predominantly residential customers. These two circuits are planned work that we have for 2017 that we've already began preparing for to do the work in 2017. The first circuit is Old River and this one's off of Bear Mountain Boulevard which is also I believe 223 and this one continues east down Bear Mountain. So, this is also one of the special programs for the targeted circuits. It has about eight and a half miles of main line, so we've already begun to do the patrols to really look at what we can do to increase the reliability on this circuit and they're projecting that it'll decrease the number of interruptions by about 37% and also the number of minutes by 29%. There are 846 customers on this circuit, it is predominantly residential, but also has a very large population of ag customers as well. As a side note, there's been a lot of work done on the Old River circuits in the past year or two, this is an extension of that, it's along Panama where the Costco was, and this is just additional work

that we're doing to really target this circuit and increase the reliability on the Old River's. The Wasco 1102 is also a planned project for 2017. This circuit also experienced three sustained outages in three years, so we took a look at that circuit and we realized that almost 7,000 feet we had again a large number of splices on that line due to repairs and a smaller conductor, so the plan is to go in over those 7,000 feet really reinforce that conductor with a larger conductor. It has 1366 customers and it is predominantly residential as well, but it also has a high number of ag and industrial customers related to that circuit.

- So, that is the formal part of our presentation, wanted to thank Denis, Steve, Alexis, and Brian, if we give 'em a round of applause for their... work in putting together the presentation and also agreeing to present it to everyone today. Also, wanted to thank the larger group that have been working for several months to take that report which has a lot of great information and turn it into a presentation for customers. For those in the room, just wanted to note that we do have a customer rep here if anybody has individual questions on their account, we made sure we had someone here to help, so I wanted to Note that for folks here in the room, and at this point on the last slide, you'll be able to hear a rerecording or to re-listen to this presentation pge.com/ertownhall. As always our 800 number, 800-743-5000 is the best immediate resource for any questions about PG&E, whether it's bill questions, outage questions, that type of thing. At this point, wanted to see if we had any questions either in the room or on the phone. Our setup with WebEx, if there's a question on the phone, I'll repeat it here in the microphone, so let me start on the phone, and see if anybody has any questions for our presenters and I'm also gonna check in the room to see if there are any questions for our presenters, I'll give everybody 30 seconds or so to think about it if you might have a question. Hearing none, I wanted to thank you for participating, for calling, for attending, and for being a PG&E customer. We're here to support you. Reliability is really important to us. We're happy, as everyone noted, that we were providing customers with good reliability, but we know that there's always ways to improve and that's why we're working not just in the Kern division, but from across our entire service territory, so with that I'm gonna conclude today's presentation and call, thank you very much.

Now the same meeting repeats.

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The first speaker, Matt Nauman, is a friendly looking heavy-set man in his fifties wearing a solid blue PG&E shirt.

Hello, everyone, my name is Matt Nauman with PG&E. I'm based up in the Bay Area, but I'm very happy to be down here in Bakersfield with my friends and colleagues and our customers today. Thanks for joining us on our Electric Reliability presentation. We have folks in the room here, obviously in Bakersfield and we also have WebEx, so we have folks listening in. If I can ask the folks on the phone to mute, we will have questions at the end of our presentation, but if you can mute yourself, I'd appreciate that. Also, if you're clicking in, click on the button that says Tiffany Refuerzo and that way you'll get the powerpoint and it'll be pointed in the right direction. So, let's start off with safety, something we always do, PG&E. If you're on the phone, obviously, assess your situation, make sure you know what you need to know to be safe. Here in the room, a couple of things here in the hotel, if we need to evacuate, we would just go out through the doors of the room and down through the double glass doors at the end of the hall, we'll assemble in the parking lot. We have sign-in sheets, so I'll ask Katy Allen to grab those to make sure that everybody is accounted for. Here at the Four Points Sheraton, they do have a defibrillator in the lobby if we, unfortunately, need something like that, it is available to us in the lobby. A lot of the PG&E are CPR qualified, so we have good support with that. Let me turn it over to Denise Newton who will kick off our presentation on reliability.

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- Thank you very much, Matt. Is it changing? Help me. Good afternoon, my name is Denise Newton and I'm a senior manager here for Bakersfield. My focus is on local customer experience and I work with a local leadership team on process improvements and determining and talking about how do we better show up as a group, how do we better show up in Kern County? So, a little bit about the agenda and what we're gonna talk about today. We're obviously gonna talk a little bit about the electric system. We're gonna talk a little bit about power outages and interruptions, what causes them, and what are we doing to help prevent power outages or your lights to go off during the day and during the evening. We're also looking at system-wide and local reliability statistics as well as what we're doing in our community and on our system to continuously improve reliability to keep your lights on and your power on, and then we'll have some time for questions at the very end. So, we've been energizing California for over 150 years. This is just a few statistics. We serve over 16 million people and we have 70,000 square miles. So basically, we're at the tail end of our service territory and we go all the way up to the Oregon border, and one of our regulators is the California Public Utility Commission. The employees here are very passionate about the community. We have over 600 employees that live and

work here in Kern County and we also support this community in many ways through volunteer hours that we support the community where we go out to different organizations. If you look at the pictures at the bottom, we do a lot of safety presentations. Safety is very, very important to our organization. We want people to be safe around our equipment and our facilities, and we also give scholarships to many students. We just recently gave a Solar Suitcase Award to a student at North High School where they are going to go for eight days to Kenya to be able to take this solar technology to help the people of Kenya which is really an amazing opportunity. We have also given over \$600,000 in Kern County through the community, through charitable giving. You can see up here some of the property taxes that we pay and the franchise fees that we pay to the city and the county. Hold on, I wanted to go back. A couple of organizations that we also support here locally that's important to this community are the Boys and Girls Club. There's a dodgeball tournament that we support. There's a lot of other funds. We do a lot of internships, job shadowing. We also work with the Alzheimer's Disease Association of Kern County and many other organizations. So, public safety and communicating with our customers is very, very important, and so one of the things that we started in the past few years is letting customers know what work we're doing out in the field, whether it's electric or gas, what we're doing to support the system and to support our community, and so some of that includes leaving door hangers on their doors if we're gonna be doing work in their area. We'll call residents if their home will be impacted by an electric outage or a gas outage, but also you may be curious about different projects or work that's going on in your community, and typically, if you're near the site of the work, you're gonna receive a letter or an in-person door-to-door discussion with somebody that's gonna talk to you a little bit about why we're doing the projects. We're gonna talk a little bit about some of those today. So, I wanted to introduce now Steve Calvert and he's responsible for our reliability system-wide for PG&E, so come on up.

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- You're welcome.

- Good afternoon, everyone. I'm pleased to be here to talk to you about PG&E's electric reliability. PG&E owns and operates over 140,000 miles of electric distribution facilities, that's about 113,000 miles overhead line as well as 28,000 miles of underground line, that constitutes about 3200 circuits across our service territory. We also operate over 18,000 miles of transmission lines. So, you might be curious where our power comes from and how it actually gets to your homes. So, PG&E gathers energy from a variety of sources as you can see on the left

slide. We have company-owned generation as well as various distributed energy resources including wind, solar, nuclear, et cetera, that power is generated from around 13,000, I'm sorry, 13,000 to 25,000 volts, it's then stepped up to a higher voltage where it's transmitted to the load centers, so the middle section of the slide talks about our transmission system. You might recall, we have over 18,000 miles of transmission, constitutes 60,000 volt lines, 115,000 volt lines, two 30,000 volt lines, and then the 500 kV lines are the ones that you see up and down the Central Valley on the large transmission towers, that power is then taken into the local neighborhoods and it's stepped down at a substation to what we call distribution voltage or our distribution circuits, that's typically distributed at, most commonly, at 4 kV, 12 kV, or 21 kV. It's then taken to a transformer that might be on your street either subsurface or on a pole, and then it's stepped down to a lower voltage before the power comes into your home. So, why are there outages at PG&E? Our goal is actually not to have any outages, but there are a certain number of cases that are outside of our control. Some of the major causes of outages include weather. Last year, it's noted in our annual report, there was a number of lightning storms that struck our service territory. We do have major events, major storm events that strike as well, I'll get into those definitions in a moment. Animal-caused outages are a big driver of outages on our system, whether that's birds or squirrels et cetera. Equipment failure is a major cause. Vehicle accidents, that's either cars driving off the road. It could be agriculture equipment striking a down guy or a pole or even large trucks running into a line, so vehicle accidents are a major cause and then third-party dig-ins or construction dig-ins are another driver of our outages. So, before I get into the metrics, the way we track reliability, I want to talk a little bit about the reliability categories and how we classify various outages. Momentary outages are those outages that last less than five minutes, more often than not, they're like five to 25 seconds in duration, you might see your lights blink and then come back on, that would be classified as a momentary outages. Outages that are greater than five minutes are known as sustained outages and that's the category of outages that I'll be talking about shortly, those are longer duration outages. We also have planned outages. Denise talked earlier about upgrades that take place on our system and replacement of facilities. We notify customers in advance, businesses as well as residential, and coordinate planned outages, so that we can do our necessary work, and then there's a category known as major events or major event days if you will. Typically, they've been averaging about six a year where it's a very unusual event and for reliability statistical purposes, those days are factored out of our reliability statistics. So, moving on, how does PG&E even know you have an outage and then how does that all roll up into our reliability system and improvement plans? On the left side of the screen, you'll see various sources of reliability data that comes to us. One is smart meter data. We have smart meters deployed across our system, they give us information on the voltage at customers' homes, whether there's a power outage, whether power's been restored as well as various other information. We get calls from customers, now that's still important part of customers notifying us. They all often tell us they heard an explosion or a line's down at a particular location, that all feeds into our

response plans which I'll get into, and then we have automated systems where remote-controlled equipment that has sensors and relays in it that detect outages and immediately respond to our operating centers, so that they know when outages occurred. So, that information from all these various sources is gathered, much of it automatically, into our automated databases, although, some of it is logged manually such as the cause of an outage, that's all put into our outage systems and that translates into various industry-wide or industry-used metrics such as SAIDI, SAIFI, and CAIDI which I'll get into on the following slides. So, how do we manage reliability and once we have an outage, what's being done about it? So, the first step which all of you may be familiar with is immediate response. When an outage occurs, we have mostly typically a troubleman that's dispatched to the location where the outage was reported. They do various investigations, they evaluate the situation and then further resources are dispatched based on the severity of the outage. We have daily outage reviews which occur, most often there's a system-wide call at 8 AM where we talk about the outages that occurred the previous day, the duration of those outages, how many customers were affected, what improvements might be possible from our response in the previous day, what kinda actions we need to take to prevent outages from occurring again, so that's a system-wide call where we talk about the major events. There's also at a local level such is here in Bakersfield, we have weekly and as well as monthly meetings where we go over the outages that occurred locally, we look at repeat outages, the causes of those repeat outages, and we actually take actions such as putting up bird guards or spreading conductors or addressing any sort of deficiency in the system on an immediate turn level. I'll share with you some statistics shortly, but those statistics help drive our annual programs. So, we have annual programs of over \$200 million that we spend in upgrading electric lines, putting in distribution automation, so we can restore power faster, replacing cable, replacing transformers, installing fuses, various types of investments to limit the impact of outages when they do occur. So, I won't go through the formal definition of all these metrics that, what will tell you is the primary metrics that we use to measure electric reliability performance are SAIDI, SAIFI, CAIDI, and MAIFI. So, SAIDI is basically the duration of power outages that a customer may experience in a given year. So, if you've had two outages a year and they were a hundred minutes each, your SAIDI would've been 200. SAIFI is the frequency, that's how often your power goes out on a sustained basis. If you had one outage during the year, your SAIFI or your interruption frequency was one. CAIDI is a measure of how good we are at restoring power after an outage occurs, so this is the average restoration time, so once the outage occurs, how quickly do we get out there and restore customers and return the system to normal, and then MAIFI is very similar to SAIFI, but it's more on a momentary basis. I talked earlier about the definition of a momentary, we also track those short outages that occur. So, how's PG&E been doing? I'm pleased to announce that last year was our seventh consecutive year of record reliability. As you can see from the charts on the page, the average duration of outage from 2010 has dropped 39%, down from 157 minutes down to 96 minutes, so significant improvement and there's

even better news for the Kern district which we'll talk about shortly. From a frequency perspective, you can look at our SAIFI, again this is the number of interruptions a customer might experience, and again this is on the average, so you'll see some fractional numbers there, but we've dropped from 1.2 to .877, so that's less than one outage a year on average, and then the duration is the middle chart that we talked about, that's really how quickly we get the power back on, so we see about a 20 minute improvement in restoring customers once an outage does occur. You might ask how did we get there, how has PG&E seen such a significant improvement in reliability? Well, we made a significant number of new investments in our infrastructure, whether that's additional conductor replacement, replacing small wire, and wire with numerous splices in it. We've also deployed a lot of new technology around remote control and smart switches, so PG&E on just about 750 circuits, we have remote control capability where the smart switches will actually detect an outage, automatically reroute the power, and minimize the outage section automatically to a much smaller segment, so before a first responder is even dispatched, the system has already healed itself if you will and minimized the outage to a small segment. We have targeted programs which really look at our poor performing circuits and I'll talk about that shortly. We track the performance of all 3200 circuits across the system. We identify certain trends and we go out and we tackle various circuits every year as to what we call our worst performing or targeted circuit program, and we've also made a number of improvements in emergency response. We have a meteorology department, we track storms as they're coming in. We have a storm outage prediction model and it helps us determine where we should pre-staff our crews anticipating outages that might occur. So, how is our reliability in Kern division which is here in the Bakersfield area? I'm pleased to report that the numbers are actually even better. In the last 10 years, we've gone from 173 minutes which is 10 years down to 80 minutes last year, so that's the unplanned outages that have occurred across the system, so we've seen about 55% improvement there. You can see the numbers for yourself, from a frequency perspective, about one and half outages 10 years ago and now we're down to .87 or .862, and from a restoration perspective, you can see we've got about 20 minute improvement there and getting the lights back on faster. So, I talked earlier and this is a key part of our annual reliability report, we are required to report out on our worst performing circuits, so on the next two slides, I've identified 33 circuits, there are some duplicates, but they're selected based on the average duration of interruption over the past three years as well as the average frequency of interruption. Since we're here in Kern division, I've taken the opportunity to identify three circuits there's two on the duration page and one on the frequency page which is shown on the poor performing list. We'll also talk about what we're doing to improve the performance of these circuits. This is the frequency list as you can see. I think earlier I talked about the average customer in Kern had seen .862 interruptions per year, this particular circuit serving 358 customers saw about three times that many, 253. You'll find from the map as well as discussions later that these are rural circuits on the east and the northeast as well as the eastern part of Bakersfield. So, again, the poor performing circuits or

the circuits targeted for improvement are actually shown here geographically. On the left of the screen, you'll see a system map showing the 33 circuits that were identified. Towards the bottom here, you'll see Bakersfield and three circuits identified. On the right, it's a little more specific, we've traced a portion of those circuits and the locations may actually be familiar with you as to where they're located. And more specifically, the three circuits are designated as the Poso Mountain 2101, Kern Oil 1106, and Lamont 1104. There's a brief description of where they're actually located and some of the causes of outages and what really drove their performance over the past three years. The first one, the Poso Mountain, you can see that we've had a number of animal-caused outages as well as weather-related outages on that circuit. PG&E has identified that as a poor performing circuit. As a result, we made a \$1.1 million investment in reliability on that circuit in 2014 and we're seeing improved results thus far. The Kern Oil circuit serves 668 customers. We've had a number of equipment failure events out there. The reliability team has since gone in and made some targeted improvements if you will to further sectionalize outages. One of the keys to improving reliability is that when an outage occurs, you wanna minimize the scope of outage, you wanna keep it as small as possible, so we do that through installing fuses and sectionalizing equipment to minimize the impact of customers and that impact on customers, and that's happened on the Kern Oil 1106, and then Lamont which serves 358. We've had a significant number of third-party caused accidents there, that's cars or as I talked about earlier farm equipment striking poles and thus causing outages, and we made some improvements on that circuit as well as we have other major improvements planned for 2018. So, with that, I know it was a high level of the PG&E system as well as a little bit of information around our performance here in Kern division, I'd like to hand the presentation over to Alexis Herrera and Brian To. Alexis is a project manager here for us. She leads the execution of many of our electric reliability projects here in Kern division, and I'm pleased to introduce her, Alexis?

- [Matt] Thanks, Steve. And again, just in case you joined us late on the phone, if we could ask you to mute. When we're through with the presentation, we will open it up for questions both in the room and on the phone, so I'm gonna hand it over to Brian and Alexis.

The next Speaker, Brian To, is a fit middle-aged man with dark salt and pepper hair. He wears a beige PG&E shirt and black pants.

- Thank you, Matt. Good afternoon, my name is Brian To. I am the distribution reliability supervisor for the Central Valley region which consists of Stockton division, Yosemite which is Merced, Fresno, and Kern. I reside in Stockton. However, we do have a local person as far as one person from my team, Juan Castillo, he lived and worked here in Bakersfield. He's in charge of reliability for

the Bakersfield division. So, basically, this is the outline of Kern division or Bakersfield division. So, Kern division consists of 214 circuits. So, what Steve alluded earlier, we have three circuits that's on the worst performance. There are 214 circuits here in Kern division. Kern division has basically 9,165 miles and so basically, Kern division's basic cover of Kern County, obviously, San Luis Obispo County, and part of Santa Barbara County. There are five service centers in Bakersfield and the main one is located on Wible Street. Right, correct, Wible? So, as you can see, that's basically the top here, and here's our capital investment as far as in Kern County for electric distribution and transmission. In 2015, we invested \$133 plus million in Kern County and 2016, by the end of this year, we will be spending close to \$184 million and we plan to invest \$199 million in 2017 and a little bit over \$207 million in 2018. What does that consist of? Basically, upgrading substation, reconductor line, install new line overhead and underground, and also install protective equipments which Steve had talked about as far as smart technology. We talked about self-healing circuits. At this time, there are 42 self-healing circuits in Kern County and we plan to add three more for 2017. And Steve was talking about as far as reliability in Kern division as far as the minutes-wise, CAIDI and SAIFI. Here in Kern division, you see basically in 2015, there was 173.9 minutes, I'm sorry, in 2016 compared to 80.3, so it's a 50% improvement as far as within the 10 years, so we've done a lot of work and seen a lot of improvement as far as for the Kern division, and as you can see, also the SAIFI number, 1.46 in 2016 compared to .862 in 2015, so yeah, it's quite a bit reduction, so we're happy, obviously, we wanna continue to improve, so that's my team and I and Steve and his team and Alexis and her team will do everything we can in order to improve the reliability for Kern Division, so Alexis?

Brian hands the mic to Alexis Herrera. She is an energetic woman in her thirties with curly long brown hair and a midnight blue, button-down PG&E shirt.

- All right, thank you, Brian. Again, my name is Alexis Herrera and I'm a project manager here at PG&E. I cover both the Fresno and the Bakersfield areas. I've been a project manager for about eight years serving both this territory and Fresno as well. So, I wanted to highlight several projects, this is not all-inclusive, of course, we do dozens and dozens of projects in the Kern area, Bakersfield area every year, but we really wanted to highlight some of those projects today. So, the first one is the Rio Bravo 1101. This is something that we completed back in 2015. This circuit comes from a substation that's located off of Seventh Standard and this particular circuit runs north on Beach. So, this circuit experienced three sustained outages in three years. So, if you remember from what Steve explained a sustained outage is, that's over a five minute duration. So, over three years, they experienced at least three of those outages where a sustained outage. What we do then is we do a detailed patrol on that line to see what the root cause is for those outages and we discovered that in about 6,000

feet, there were numerous splices in the cable which indicated that we'd gone out and made repairs due to the damaged conductor. So, what we did is we reconnected that 6,000 feet and put in new wire, larger more stable wire. This circuit has 369 customers on it, it is predominantly residential, so our residential customers should be experiencing better reliability based on that project. The second circuit is the McFarland 1101, this is something that we actually just completed last month, so it's a recent project. This circuit is located off Elmo Highway and that particular circuit runs east down Elmo Highway. This is a very special program and Steve alluded to it when we talked about a targeted circuit. So, what we do is we take the whole main line of the circuit and this particular one was a very large circuit, it was 12 miles of main line, and we did a very detailed patrol, and instead of just focusing on the cable or the equipment, we look at everything that could be potentially causing an outage for customers. It could be trees, it could be animals, anything and everything related to what could cause an outage for a customer, and based on that, we went out and we performed work, and what they predict is that it will reduce the number of interruptions by about 74% which is pretty good, and it will also then decrease the amount of minutes that a customer would experience by about 64. This is a pretty large circuit, I believe the average is somewhere around 1800, but this one is very large, it's 2339 customers, also predominantly residential customers. These two circuits are planned work that we have for 2017 that we've already began preparing for to do the work in 2017. The first circuit is Old River and this one's off of Bear Mountain Boulevard which is also I believe 223 and this one continues east down Bear Mountain. So, this is also one of the special programs for the targeted circuits. It has about eight and a half miles of main line, so we've already begun to do the patrols to really look at what we can do to increase the reliability on this circuit and they're projecting that it'll decrease the number of interruptions by about 37% and also the number of minutes by 29%. There are 846 customers on this circuit, it is predominantly residential, but also has a very large population of ag customers as well. As a side note, there's been a lot of work done on the Old River circuits in the past year or two, this is an extension of that, it's along Panama where the Costco was, and this is just additional work that we're doing to really target this circuit and increase the reliability on the Old River's. The Wasco 1102 is also a planned project for 2017. This circuit also experienced three sustained outages in three years, so we took a look at that circuit and we realized that almost 7,000 feet we had again a large number of splices on that line due to repairs and a smaller conductor, so the plan is to go in over those 7,000 feet really reinforce that conductor with a larger conductor. It has 1366 customers and it is predominantly residential as well, but it also has a high number of ag and industrial customers related to that circuit.

- So, that is the formal part of our presentation, wanted to thank Denis, Steve, Alexis, and Brian, if we give 'em a round of applause for their... work in putting together the presentation and also agreeing to present it to everyone today. Also,

wanted to thank the larger group that have been working for several months to take that report which has a lot of great information and turn it into a presentation for customers. For those in the room, just wanted to note that we do have a customer rep here if anybody has individual questions on their account, we made sure we had someone here to help, so I wanted to Note that for folks here in the room, and at this point on the last slide, you'll be able to hear a rerecording or to re-listen to this presentation pge.com/ertownhall. As always our 800 number, 800-743-5000 is the best immediate resource for any questions about PG&E, whether it's bill questions, outage questions, that type of thing. At this point, wanted to see if we had any questions either in the room or on the phone. Our setup with WebEx, if there's a question on the phone, I'll repeat it here in the microphone, so let me start on the phone, and see if anybody has any questions for our presenters and I'm also gonna check in the room to see if there are any questions for our presenters, I'll give everybody 30 seconds or so to think about it if you might have a question. Hearing none, I wanted to thank you for participating, for calling, for attending, and for being a PG&E customer. We're here to support you. Reliability is really important to us. We're happy, as everyone noted, that we were providing customers with good reliability, but we know that there's always ways to improve and that's why we're working not just in the Kern division, but from across our entire service territory, so with that I'm gonna conclude today's presentation and call, thank you very much.

At the end of the video is a blue screen with the PG&E logo that reads "Together, Building a Better California".