

## The Eaton Fire and the Implications for Portland

Robert McCullough

April 14, 2026

[00:00:00]

[00:00:05] **Dylan:** joking. We're here for the roast of Robert McCullough.

Hi, I'm Dylan Rivera, Reed College, class of 95. many of you may know me as the Public Information Officer for the City of Portland Bureau of Transportation. Tonight I'm speaking not for the city, but as an active read alum and here to encourage all of you who are alumni to participate and also to welcome those of you who are not alumni, and especially my colleagues from the City of Portland, fire and Rescue, bureau.

Thanks for, being here, everyone, so tonight we're going to, hear from Robert McCullough, class 72. like many, Robert is an incisive and provocative speaker. I think we're going to have a good time. [00:01:00], don't forget, we'll have a reception afterwards at the Vollum Lounge, which is on the upper level across the hall, and we'll give you reminders, about that afterwards, about drinks and snacks and, we can continue the conversation over there.

Tonight's event is the kind of, event that a lot of alumni have been seeking. Getting advice and sharing experiences and, expertise, of professional expertise of alumni is something that alumni has been looking for a long time, so, we encourage everyone to, get involved. If you're an alum with a career professional networks, we have a flyer there.

And, with these professional networks, you can share your accomplishments, post job openings, and, seek advice, from others in your field. We've got in, uh. May or June, the next couple of months, we're expecting to launch a professional network on Readies in education. So those of you involved in education, [00:02:00] update your IRIS profile, make sure you're identified that way, and expect an email to your inbox there.

There's a flyer with the QR code to get you to the website for professional networks. Another great way to volunteer is to, volunteer with the, RAMP program, read Alumni Mentors program. this is more kind of the one-on-one advice, for a student or young alum typically, or an alum mid-career looking for advice on, the next step in their career journey.

So it can be really rewarding to see, your fellow alumni develop and, follow your advice and progress in their careers. May a couple other events coming up May 27th, we'll have, the alumni College. We'll have a career panel, on a protest, something a lot of reads are familiar with. I'll be featuring Lori de class of 19, [00:03:00] Sean Long, 2012.

Bear Wilner Nugent, one of my classmates from nine five, and that's going to be May 27th, 6:00 PM And that's, that'll be a virtual event. Then, the most wonderful time of the year for Alumni Unions. June 11th through 14th. Come one, come all. It's cheap. It's a great time. It's a party in your honor, and you can hang out with a bunch of reads.

What would be more fun? So with that, Robert McCullough is with us here. Tonight, Robert has a way of showing how complex issues can impact our everyday lives. He's an expert on market manipulation, as a principal of McCullough Research right here In Eastmoreland. He's been active in business for 32 years, advising [00:04:00] governments at all levels and utilities about market manipulation issues nationwide, from coast to coast across a variety of, of sectors, energy, and various commodities.

He's testified and consulted at every level of government. His congressional testimony helped uncover the Enron scandal from the early 2000's. many of us will remember that, and many of you may know him as a vocal advocate for the Eastmoreland Neighborhood Association. So that's another sphere where he's up operates.

My, old, professional colleague Nigel Jaquiss at Willamette week, called Robert a Blunt if loquacious truth teller. So with that, please welcome Robert McCoullough.

[00:04:55] **Robert:** Thank you very much, Dylan. I was a little worried, but it turned out okay. [00:05:00] So, the rule is you start with a joke and then of course you go to the conclusion, then you give the speech, and then you give the conclusion again. There's nothing funny about what we're talking about here. We're analyzing the causes of a major disaster, one of the largest disasters that we've had in, wildfires or in fact almost everywhere.

But I am allowed to make fun of myself. You'll notice this slide pretty close into it that cites Aristotle. That's included in the same sense that the beginning of Don Quixote has Cervantes, explained that he made up the dedication so that people would think he was more important than he was.

So when you get to Aristotle, I'm just showing off, and I can remember as a 17-year-old listening to a [00:06:00] gray-haired professor who I thought was very old, probably younger than I'm, teaching me the same lecture, which is not bad. Okay, so what are we doing here? Pretty simply, the Eaton fire was almost certainly infrastructure cost.

It was enormous in terms of its, property impacts. Luckily, only 17 people died. By the way, the officials are still not agreeing on how many people have died, I've noticed. But at some point, we'll be able to get the ones that are still living off that list, I hope. The complexity of what went on was of unusual levels.

Southern Cal Edison is one of the most sophisticated utilities in the world. They had published a 900-page planning document to only a month or two before the event. Not many people have read it cover to cover. I have to tell you, [00:07:00] I have gone to sleep with it at night more than once, but we do know a lot now.

We are still 15 months in and we've yet to see the official report, which is unusual. So hopefully we'll see that very soon. So I will commence with the new gadget, which will promptly fail. Quick introduction, you've already heard most of it. Reed 72' wonderful experience. Lifetime, friendship with Paul Bragdon, Otmar Rudolph, other professors, and all of whom are now in heaven arguing with each other.

Graduate studies of PSU and Cornell. I'm a retired executive of Portland General Electric. I've run the, consulting firm since 91' and pretty much done everything. We are currently in litigation in Quebec, Ontario, [00:08:00] soon to be in Manitoba, California, and Nebraska. I believe, expert witness and I have gotten in trouble many, many times.

So most people don't realize that 10 years ago we would not have had this conversation. The onset of billion-dollar wildfires really began in California, Southern California, which is a desert, a hot desert, a dry desert, and has moved state by state to the north, state by state to the east. We're now seeing similar wildfires as far east as Oklahoma and huge wildfires in northern British Columbia.

At one point, the government estimated that 20% of their forest had burned three years ago. I no way to tell that because we don't actually have people living there, it's, largely [00:09:00] untenanted. The L.A. fire absolute disaster, absolute tragedy. Palisades was human caused; Eaton was infrastructure caused.

Amazingly L.A. with all of its resources and expertise was generally unprepared. They had problems with dispatching their existing resources in spite of excellent weather forecasts. Amazingly complex plan, and a lot more money and manpower than we have. So the risks are real, that a major event can actually cause the same level of problems here.

Now I went up to apologize in advance to the fire department. It's very pleasing to see you here. There are no shots on anyone here. There are no villains. We're in the situation of trying to catch up [00:10:00] with a moving target, and it is tough. So one reason to apply the Eaton fire analysis to Portland was hopefully to help people get a move on.

So coming here without anyone to complain about that is very unusual, Dylan. So, our laws, our economic models are deeply siloed. Division of labor was central to the failure to predict in Los Angeles County. The primary player, Southern California Edison, had an enormous study. The operational entities with rules to play were less prepared and deeply siloed.

The water department had not communicated well with the fire department. The, fire department was undermanned with a lot of their equipment offline. The emergency broadcast system failed repeatedly. [00:11:00] Ivan Penn, the New York Times reporter who covered this, in lead actually had to leave his home. Even though there was no risk of fire there, as the emergency system failed.

So this is a presentation, an economist presentation on political economy. Okay, I apologize about Aristotle. Everyone is supposed to mark down, Robert paid attention in the fall of 1978. oh my God, 1968. This is scary. So Aristotle was smarter than we are, which is why I remember him 2,500 years later.

He identified four forms of causation. Basically, material what the problem is made of, what the actual item was. In this case, the city. The efficient cause was an out-of-control wildfire that consumed two [00:12:00] neighborhoods. The final cause is the process that we got here. That's what I'm mainly interested in, why our institute not prepared to handle it.

I'm not going to talk a lot about embers, ignition points and firebreaks. There are people in the room who know vastly more than I do, and an elected official would spend a lot of time in the tragedy and heartbreaks. I'm not going to do that either, even though we feel for them. I am going to talk about what we should have been doing before the fire.

By the way, this is a battle that is almost entirely fought before the first ignition point.

Finally, political economy. What rules do we need to change in the future to be better prepared? Why use a vintage term like political economy? This is sounding like Adam Smith. Now we know economists love formulas and graphs and charts.

Those are fine, but [00:13:00] it's the organization of how we approach the problem, that was the problem. We have institutions like the utility regulatory code that does not reward taking chances for the public good. We have cities where we have broad divisions between the different agencies block cooperation. That doesn't help us.

The utilities do talk to the cities that they operate in -- Portland General Electric. My old home is very well run and does quite a bit, but it's still a foreign relationship. So PGE is focused on Forest Park because that's where their transmission lines are. That's where our high technology is focused.

They're not focused on the rest of the Willamette river valley where most of us live, both in Southeast and Northeast. And all my comments today apply as much to the University of Portland as they do to Reed College. [00:14:00] Bottom line, we need to anticipate a wildfire less than a mile away from here, and a wildfire that moves at two miles an hour.

So we are talking about something that's walking speed, perhaps running speed. So these are desperately dangerous events. Science Magazine, one of the most important scientific journals on the planet, had an article, last year that indicated that all statistics indicating wildfires are speeding up.

Of course that has to do with drought and heat and wind, all of which we are getting more of. So as most of you know, we could walk to Oaks Bottom from here. As we walk there, what we come to is a 50 to a 100-foot drop into the river level. More so up at the University of Portland, less so here.

That's a very dangerous area because it's very difficult to [00:15:00] get to. So the two fire trucks we have here, are not going to change that event. That's a question of resources and planning. We are getting a very dry hot summer this year. This is an El Nino, and we're hearing about a Super El Nino.

We actually do have droughts, I'm sorry to say and we actually do have winds. I'll talk about winds in a moment. Five years ago in Sellwood-Moreland, my car

told me that it was 120 degrees as I drove through. Now, a lot of that is simply because the air conditioning was pumping heat back out to the street, but 120 degrees is a hell of a lot of degrees.

So, the Eaton Fire started at 6:10 PM how do we know this? Well, we did the [00:16:00] utility level investigation. New York Times found footage that was not on official cameras. The security camera of a local gas station pinpointed it and a firm you haven't heard about, but you will in the future, is called Whisker Labs that does millisecond level recording of the electric system.

Some of you will know that we use an unusual system where we reverse the direction of current 60 times a second. That is very hard to work with. Whisker Labs actually go a thousand times as fine in researching what's going on.

The fire quickly engulfed the hillside, 17 people died, 9,147 structures. That, by the way, is Sellwood-Moreland, Brooklyn, and Eastmoreland it gives you a good idea the scale of just the Eaton fire. [00:17:00]

How did so many people get the wrong answer? And once we know that, what do we fix so it doesn't happen again? The most sophisticated wildfire planning exercise in the world was performed by Southern California. I've said that several times to emphasize, we're not talking about people who are malicious, stupid, uneducated or lazy. We're talking about the best of the best.

It was the institutions that led them there, and made sure that their best efforts did not actually achieve the right outcome. I'll go into the bits and pieces of it, but regulatory theory, certainly the modeling, the degree of preparation in advance, the budgeting. All of those things conspired to give us the wrong answer. [00:18:00]

Now, some people have yet to understand this, but once the fire starts, the battle's half over. A number of people asked me, what should I do around the house? Well, unfortunately, there's not much you can do around the house. Eastmoreland is known for its urban canopy. I love it, I've helped protect it for the last 20 years.

It's a terrible risk. We have to keep it hydrated. That's the best thing we can do. On the houses themselves, they're difficult to rebuild to face this, certainly changing roof composition is important. The embers in Altadena, were setting houses of fire, two blocks behind the fire department.

Where do these fires come from? Human error is very common source. We had three fires, probably of human error in Oaks Bottom last year. None of them were serious. The fact is that's always going to be [00:19:00] there. Nature, as I said, we seldom get lightning bolts in this city, unlike where I grew up. Lastly utility infrastructure. We are increasingly electrical.

We are increasing the amount of infrastructure. We are going to have to retrofit all of that before we're done. one good thing that came out of this is SCE says they're going to underground Altadena. They should have done that in advance, but that was not part of that planning process.

So why do we have the wrong formula? Well, the founder of our industry, the richest man in the history of the world was Sam Insull. He was Tom Edison's secretary, back in the days when that meant “man of business”. I don't think he ever fetched a cup of coffee in his life. He did found hundreds of companies.

He [00:20:00] electrified the Midwest, went on to have impacts in Europe and across North America, and was, insanely smart, probably as smart as Tom Edison. However, he really wasn't interested in what we're talking about today. He was interested in raising money with bonds. To raise money with bonds, he had to have a stable institutional structure.

So he passed the laws in every state, and then went further to build the regulatory apparatus to keep the utilities stable. You'll notice the word stable, not taking risks, not planning ahead. He was interested in getting the bonds repaired.

Now, my staff said this slide is completely irrelevant to the speech, but I always love it.

This is the fellow in your Monopoly set who gives and takes away money, [00:21:00] and he's leaving the Cook County Jail In 1932. His prosecution for the bankruptcy that occurred in the Great Depression took away our great grandparents' money, and there was a lot of anger coming out of it. We got all of the federal regulatory agencies, which unfortunately solidified baked in this inability to plan ahead and take risks.

So this is exactly the opposite of Silicon Valley, where they're all completely crazy risk takers. We actually only do things that have level after level of regulatory approval, which means we are always. A year, two years, three years behind, which is fine, so long as we don't have global warming, but we do have global warming.

So we are learning our lesson literally day by day. So let's jump [00:22:00] up to 2016. Starting in 2008, SCE built a new transmission line and it passes right by the town of Altadena. In fact, Altadena is at the cusp of the curve in the line.

So here we are at Altadena. Here is the line basically surrounding Altadena.

JAC - [00:23:00]

Now, what did that mean in practice? It meant that Altadena was exposed to a high level of risk. Was that discussed in 2008 through 2016? No. Worse than that, the engineering parameters that we use for large utility projects changed between 2008 and 2025. Wind speeds are way up. Heat is way up. All of those go into the design of the towers and the lines and the substations.

The US Forest Service owned the land, but under our arrangements, the US Forest Service did not regard them as a stakeholder. No one is suing the US Forest Service for leasing that land to SCE. If I rented a dangerous object to a third party and the third party had a disaster, people would be after me.

But that's again, a problem that we've disconnected the institutions and the economics, and we end up with the wrong solution. So some of the major stakeholders really weren't at that table. Some of them are still not at that table. Worse than that, all of this went through a detailed regulatory process, which was never revisited in the 10 years after the line.

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So, we had a line that needed to be retrofit because of that 10-year process where we've learned about wildfires, but was not. In fact, there is no normal process to retrofit to changing environmental parameters. So, January 7th, the US Weather Service, NOAA, one of the finest weather services in the world, one of their most advanced research centers is up here on the Columbia River, that keeps us safe from floods and, also under attack by the president. They did exactly the right job at the right time, and on that morning, they came out with their red flag warning. For those of you who haven't heard about this, this is, I'm going to use a bad word, a holy shit moment.

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If you see a red flag notice, you actually go to visit your cousins. It is a very serious event. So there was no question that we knew what was going to happen on the seventh. Interestingly enough, Adam Smith, a scientist, at NOAA was evicted from there for his studies of the rapidly increasing pace of natural disasters.

And that's someone who's one of the most foremost experts in the world, and he's found a place with an independent expert and William a Reed graduate who's working for me now. Has actually contacted him and we offered to help him maintain his database on these events.

[00:26:00]

So hindsight is always best. I obviously know exactly what's happening because I've spent a year studying the Eaton fire. That's nonsense, obviously, but I can tell you some things. Property rights of Altadena should have been considered and protected. Certainly the US Forest Service should have taken more responsibility before they undertook this. California Public Utility commission failed to consider the implications of the decision, not just the cost, but remember, Sam Insull only cared about the cost.

He was guaranteeing the bonds. He was not dealing with a rapidly changing climate. And of course, Southern Cal Edison made a mistake somewhere in the modeling, and we'll talk about that mistake in a minute. So what can a utility do after the point of ignition? We only have one tool. Now this is funny. The most powerfully funded enterprise, sorry about that, has the least involvement.

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And that is they can turn out the lights. Now we have PSPS programs in the state. There's a lot of litigation concerning PacifiCorp at the moment. We've all read about that in the paper many times. We know that, it works, but it also has enormous implications. Certainly hospitals, other infrastructure sick folks who have machinery depending on all have to be considered.

So did we shut down the Tehachapi renewables transmission project? And the answer is no. Would this have happened if we had? No. So why was it that this critical decision wasn't made and it was certainly not made because Southern Cal Edison would have preferred it? Obviously at this point they would much have preferred it, but even at the time, they probably would've preferred it.

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Number one, the regulatory process in California is the deepest in the world. There are regulatory agencies layered upon regulatory agencies. The California ISO is in charge of the transmission system, and I've underlined the fact that they would like 48 to 72 hours advance notice. Now, there's no one in this room who should believe that we have 48 to 72 hours. That's an impossible standard. Now, SCE could have said to hell with us, we're going to do it anyway. But that goes against all of the regulatory process finance training that's in a privately owned utility.

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Worse than that, it appears that there are stability problems in the system by doing major PSPSs in the LA area. The ISO did a very serious study in 2021 that we don't know what the answer is because it's classified. Now I can make that into a conspiracy theory, but it isn't. The reality is there are only very few reasons why utility planning document would be secret, and the dominant one is national security.

It is quite possible that there's a node in that network that is so critical that they did not want to discuss it publicly. It also implies to me that there is a level of fragility that should have been addressed proactively, not studied in 21, and then left four years to have made an important decision on SCE not to interrupt. I'm hoping that when we see the official study that we'll hear more about that. I know it's going to come up in the litigation.

[00:30:00]

We also have another institutional problem. It's the inverse condemnation doctrine. When you have an infrastructure failure. This allows the litigation to assume that you are the fault and you have to pay all of the money. Now, when we're talking about these fires going to the billions of dollars, nobody has that money.

[00:31:00]

So what happens is, as has happened at Pacific Gas and Electric, we end up with a political deal and everyone gets stuck, including people who are completely uninvolved. So the incentives to get it right are diminished. So we're going the wrong way down that path. Now obviously the inverse condemnation doctrine is English common law, so it must be right, but it's also the wrong answer and it also leads to the wrong decisions.

So let's talk a little bit about what went wrong with the 2024 wildfire mitigation plan. The first thing is it has an enormous amount of work on risk analysis, which is the key to all of this node. The reason we know how to handle an emergency at a nuclear plant is not because we learned it in high school.

It's because the NRC and other institutions have worked their tails off for the last 50 years to understand every facet of this. And as an executive of a nuclear utility, I can tell you that, that we took it very, very seriously. I was on the board for the Reed Reactor and for a long time there were items at the bottom of our tank that nobody had could get out without violating NRC rules.

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And obviously for students, what we want them to do is understand NRC rules. So that was the right thing. And we did get into a lot of trouble with the rubber duckies. And they did allow us to remove the rubber duckies, which I think was a good move. Oh God, did I let this secret out?

[00:33:00]

SCE planned a \$2 billion per year mitigation fund. That sounds like a lot, but it turns out not to have been the right number. The fact is we are facing the same run up in rates here as we are doing vegetation trimming. PGE has been by twice this year. We are actually undergrounding lines. We are adding electronics. We're adding cameras. We're insulating lines. I was, I'm talking to one of the fire department folks about that, and all of those things have to be retrofitted. So this was not a bad budget, but it was the wrong budget and it came from the risk analysis.

So, how does this risk analysis work? As we go down the left side, we're talking about all of the specific components of what could go wrong. On the right side is just the PSPS analysis, which is sort of interesting that they have them equally weighted and that gives you an idea of the basic detail of this system.

[00:34:00]

Then they develop what they call a bow tie, and I'm a little amused by that cause we know their public affairs department was trying to lighten the load of the document. So it did not read like Crime and Punishment. But the bow tie on the right is what they're going to do to fix it. On the left is what causes the problem.

All this leads to a numerical score. And what they've done is they've used very advanced technology from TechnoSilva Consulting firm that has pioneered this everywhere along their infrastructure, including altered data, walked through that analysis and found the ratings. Once they have the ratings walked through, the mitigation steps they're going to undertake.

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This is exactly the right plan, so why didn't it work? Well, on the bow tie, the left wing is primarily weather and terrain. Weather, heat, drought, wind are the first steps. Hill sites are important. Escape routes are important.

On the right side, we have the various steps they're going to take. The larger the area on the left, the more important the steps are going to be. On the right says there's direct model causation in this. They did not take 900 pages because they were loquacious. They took 900 pages because they're trying to estimate systematize this for one of the largest cities in the world.

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Now, at the very bottom of all of this is the eight-hour rule, and the eight-hour rule says they cannot predict what the fire department will do, so they assume there will be no fire response for eight hours. Then they use that to determine the geographic area. This is a terrible rule. Number one, all of the parameters within the eight-hour rule were wrong, and we'll see in a moment how wrong they were, but basically, they violated the common sense of the outcome by assuming that this would be a small fire.

Up on segment 11 of the transmission lot, a significant fire is one eight hours after ignition burned more than 10,000 acres, or had at least one fatality or 50 structures impacted. We had hundreds of structures impacted at eight hours.

[00:37:00]

In modeling, you often run into the leaning tower pizza effect, and what it says is the more complicated the model, the more vulnerable it is to a single bad assumption at the very base of the calculations. Years ago at Portland General, I went over to Bonneville to explain that their model that said that Trojan nuclear plant was non-economic, had an error.

And we had a big fight. Finally, I won. Then of course, we discovered that it was non-economic and we closed it. But in our defense, the steam generator

problems that emerge a couple years later were not known at the time. The fact was Bonneville is a very sophisticated organization and only someone who maintained similar models would've known where that error was and how to correct it.

There's nothing wrong with the leaning tower piece except for the foundation. If we fix the foundation, it would be the non-leaning tower Pisa. So that's where we are with the eight-hour rule. The causal sequence is assumptions, modeling, consequences of mitigation. The eight-hour rule caused the Eaton fire because it underestimated the scale of the fire right at the start of the ignition.

[00:38:00]

We were beyond the scaling of the fires within literally hours and way beyond it in eight hours. The eight-hour rule was discussed and adopted at the California PUC and is used by SCE. Now we're back to Sam Insull, aren't we? The basic conservatism of that regulatory process. It's probably used here in Portland as well. The PGE plan, which I've also been through, is not as explicit on this. It's, PacifiCorp in their litigation says it's effectively universal. So we are seeing a variety of risks of people doing very advanced modeling with some very poor assumptions at the beginning.

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So let's just do the timeline. The timeline's pretty straightforward. We know the exact start because we know the system faults through Whisker Labs. By the way, you can detect the faults all the way in Portland, Oregon. They give you the scale of this transmission line. And fault means that they were violating the normal operating conditions according to Whisker Labs.

Those faults had started 30 minutes in advance, which matches some SCE data as well. 6:18. Then, we see the fire 6:26. It's at 10 acres. I'm just quoting directly out of the Cal Fire reports. We have flying embers, setting structures of fire nearly a mile away. That's high winds and heat. We have fires two miles southwest from the origin that's in the heart of Altadena.

[00:40:00]

We have by midnight it had grown to a thousand acres. That's vastly more than the scale that's SCE had put on it in their mitigation. We had, of course, an enormous fire coming out by 6:00 AM the next morning. By the end of the fire,

we were over 10,000. So by any standard, this was a major dangerous fire by their modeling.

However, as I said, the eight-hour rule gave them the wrong answer because they did not see this. They did not see this. They did not proceed to the mitigation step, which might well have changed things. Here is satellite imagery of the fire, and that's less than eight hours. The red marks are heat detected from orbit.

[00:41:00]

You can see the streets. All of those are on fire. Now, according to them, according to that model, that none of that happened. The model was wrong, assumption was wrong. The result was wrong. Now, I can't swear to you that we would've avoided the fire from this. There are some mysteries yet to learn, but we should be using it.

JCE - [00:42:00] Number two, it was appropriate for a PSPS of section 11 of the TRTP if that could be done. We still do not know whether there is an operating problem so severe that we could not turn off that section of the line.

Number three, we had no pano AI ignition surveillance.

One of my goals here today is to goose city council. I'm not sure they're goose-able, but I'm giving it a try. We do not have any of those high-tech cameras directed at the east side. We should have one facing us, and we should have one facing the University of Portland. Both of those are highly populated areas and they could also lead to a serious fire.

[00:43:00] What are they actually doing? They are 360-degree cameras rotating 60 times a minute. They're designed to detect smoke and fire 24 hours a day and communicate that immediately. If we'd had one at Altadena, we would've had a few minutes more warning. Could we have gotten a water bomber to the right place? I think we could have, we'll never know, but I wish we'd had the chance because if we had, we might have avoided the disaster.

There should have been upgrades to the towers along Section 11. As I said, they were designed in 2008 with different parameters for the weather. There was nothing wrong with the towers per se, but given global warming, they were now old. Obviously, they could stay in operation for 50 years, but if they did, it would be an entirely different environment than the one they were built for.

[00:44:00] We did some of the work for the New York Times, for the Louisiana Storm where all the power went out for New Orleans, and we identified one of the towers that had collapsed and the New York Times said that it had collapsed, and the local utilities said, no, no, no. it just fell in the river. Well, the point of the matter was the wind speeds coming up the Gulf have increased every year for like the last 20 or 30 years. We know that we've seen the destruction and there are towers going into New Orleans which were just too old. Even though they were relatively new installation of the lines. A critical increase, certainly at the distribution level.

Traditionally we hang naked lines. When they fall, we send utility folks off to the grade school saying don't touch them. We had a death I saw on the news from someone who got a power line across their car and did not know that they couldn't get out of the car cause the tires were insulating. We had one of those on Reed College Place about 10 years ago, and I got out, called PGE, which came immediately and got it.

[00:45:00] I told everyone not to walk on that side of the street, and several people looked at me and said I was crazy. They had not listened in grade school. So that is a relatively inexpensive upgrade. That helps a lot on the distribution level, undergrounding of segments. That's going to happen everywhere. The fact of the matter is the amount of energy that goes through a 230 KV line is unimaginable, and so we're really going to have to underground these throughout.

I've followed the debate about Forest Park and the transmission lines. It's being argued under land use law, which is ridiculous. What we really need to do is make sure that those lines are undergrounded, because if we had 160 mile per hour windstorm coming out of the gorge, they were also not built for that sort of weather, nor had to be under the regulations.

[00:46:00] And then the last one, which is rather interesting, which we have studied the hell out of it, we call it research, is remove the abandoned towers for a reason that no one knows. SCE did not remove a series of abandoned very old towers along this path. They're not energized. If, Jean-Carl was here, he would get up and say, damnit, they were not energized.

And we've had a big debate about this, but there is a scientific argument that induction, and I can show you how induction works. You take your phone and you put it in the cradle. The energy required by the phone is induced by the mechanisms in the cradle, the inverse. Square rule means this only works on the table.

[00:47:00] If you leave the phone in the car, it doesn't recharge. So induction is a pretty doubtful explanation in my mind. There have been two recent scientific studies that say that there is some justification for the argument, in part because the existing wires would be flexing in the wind, it might have gotten much closer to the abandoned towers. That's going to be argued out in court for a long time to come.

Whisker Labs gives a different answer and the one I prefer, which is that we were having a series of faults from towers already collapsing, like the start of the Hurst fire. And that was putting stress on the system and the stress on the system was showing up for conditions the towers were not built to withstand.

[00:48:00] Again, I think one of the reasons we waited 15 months is that the science of that is so complex. The modeling of such a thing is really super computer level modeling. And, in all of my career in the electric business, I had never heard of that being a possibility until last year.

I certainly hope this is not true because if it is, we have a much larger group of rebuilds in front of us. Positive responses to the fire. SCE is committed to substantial undergrounding in the Altadena fire. By the way, the only neighborhood that did not burn was the one that had undergrounded distribution lines.

[00:49:00] As wind speeds go up, we now understand how dangerous the distribution system could be. The cost of undergrounding is falling. We're much better at undergrounding than we'd ever been before. Technology for real time ignition detection is expanding rapidly. British Columbia Hydro is now installing these cameras throughout British Columbia, which is a big place.

So, it's going to be a big bill, but it's going to be critical for protecting the forest. And bear in mind, since we are concerned about global warming, a major source of carbon is our wildfires. We did some work for one of the parties in British Columbia and indicated that if you added in the wildfires to the carbon budgets, the line goes directly through the roof.

And obviously our ability to model fire risk is greatly improved.

[00:50:00] So Pano ai ignition cameras, PGE does not tell us where they are, but anyone can actually go drive to the place where you think they are and there they are. I understand why they would not want someone to go play with them. Very excellent piece of equipment. Not terribly expensive. They're \$50,000 a

year to install and maintain, compared to the losses, Eastmoreland could buy one.

I'm not sure what we do with it, but it's not really a major cost. This is the sort of equipment we should have on the west side pointing east because of the amount of population at risk. The equipment is quite magical. I've watched it operate. I'm very very impressed by it. I'd like one myself.

[00:51:00] I've noted if we had 10 more minutes at Altadena, we might've made a difference, and we might've made a difference if we'd had one of those cameras in the right location. Technosylva, these are magicians. I mean, they really are doing an incredibly good job of modeling geography, heat, wind, and they're turning out very good estimates of what's going to happen next.

Now, bear in mind the mistake and the assumptions show up in their models. If you get the assumptions wrong, the models are wrong. Again, this is the leaning tower. We need to fix the foundation if we want to be able to walk up it easily.

So, conclusions are pretty straightforward. SCE modeling was impressive, but wrong. The severity of the fire was wrong. The mitigation coming from the modeling was wrong. The blame has to be shared with a wide variety of people. Certainly the regulatory framework that rewards conservatism, as opposed to thinking in advance.

[00:52:00] If your dad takes you hunting, he tells you to shoot where the bird is going, not where the bird is. This is common sense for half of America. Sadly, it's not part common sense of the SCE. So, for regulatory models, basically, we need to change the rule that it's better to ask permission than apologize. We need to be able to apologize by taking steps at the right moment, at the right time.

Silos. Everyone here who has worked in Portland knows about silos. A friend of mine who is a senior executive at water and sewer explained that he hated PBOT. PBOT hated them and that's because both sides dig up roads, but not always at the right time. Did I say it right?

[00:53:00] This is a serious problem in LA. I don't think our problem is quite as bad, but water was strictly not prepared, and it went beyond the one reservoir that was not filled. US Forest Service, terrible siloing. They had responsibilities to fix this. Now I love the Forest Service. But the fact is they should not have leased the land without a full risk analysis of their own inverse condemnation.

[00:54:00] This is good for lawyers, and some of my friends are lawyers, but it's the wrong answer to the wrong problems. Let's turn to Portland. We're a smaller county. LA County has 12 times the population. I'm just going to compare the city. Far fewer firefighting staff in Portland. Not enough, in my opinion. Most cities are deeply siloed with multiple jurisdictions, utilities agencies, and bureaus.

We have three different utilities, Bonneville, PacifiCorp, and Portland. Bonneville only shows up here in the transmission level. We have two large electric utilities and quite a number of small utilities in LA. Geographically, there's similarities. The West Hills and the Willamette Escarpment have serious elevation issues. Obviously, the mountains around LA are vastly larger, but we're really interested in that first mile.

[00:55:00] Here's the simple list, by the way. When anyone looks at this, including my staff, they say, "how could the budget in Portland, Oregon be so close to the budget in LA?" The fact of the matter is no one has ever been able to read our budget documents, including me, and I expect this is just the wrong number.

Pardon me. I hope we don't have a budget person here. They're basically three times geographic size, six times population size. Now, the good news is they do have more resources. But unfortunately, they were not well dispatched. What's the bad news? Well, we own the record for highest urban wind speeds at 160 miles per hour.

When I was looking through materials, I found this wonderful picture of a tree uprooted leaning on the rotunda at City Hall. It gives you an idea of what the wind was like in the Columbus Day storm. We are far ahead in wind speed risk. Now, what do I know about wind speed risk? Absolutely nothing.

[00:56:00] What do I know about being worried about it? Quite a bit as this is what we'll get in our red flag warning.

Institutional conclusions from LA apply to Portland. We are not responding quickly enough. We have some very high-risk zones. Certainly Forest Park. We also have high risk zones that are next to large populations. Here's Portland Parks, and you'll notice we have a strip right along the escarpment. Now it's not a wide strip because what we're talking about is shifts in the river over the years. But the problem is that once started, it's a very hard fire to stop.

[00:57:00] Here's PGE's high-risk areas on the map. Now you notice they're doing a hell of a lot of hard work, but none of it's here because they're focused on their infrastructure. This is a siloing issue. So we have a problem that they need to be more integrated into our plans. The funny part is the utilities tend to have the most resources but they're not applied constructively in getting to that solution.

PGE and Portland Parks share the Forest Park concerns, but quite frankly, most people don't remember Forest Park is not the issue. The issue is these six miles of petrochemical storage at the foot of Forest Park. Again, we're having litigation by environmentalists wanting to reduce the amount of fuel in the tanks.

[00:58:00] Okay, that's fine, but it's the wrong litigation. We certainly need our risk studies to include both areas of risk. The good news is we don't have many people there, so we may be bicycling to work for several months after the fire, but probably not many people will have died. The opposite is true here. We have less infrastructure, but we certainly have far greater risk in terms of structures and human life. The transmission lines across the top are the BPA and PGE lines that we're debating. We have other lines going through the park now that are well monitored, so we're doing the best we can on that. Now we go to our local situations.

[00:59:00] Here are the transmission lines at Oak's bottom, and you'll notice the one side we picture a steel tower that's bringing in power from across the river. And then we have a tower next to it that's going up and down Springwater trail. By the way, the first transmission line ever built in the world was built right along this path.

Luckily, it's not still in service, so this is a serious issue. That wooden pole is a risk area and you'll notice that we are going right up the escarpment there towards the park. I went and walked that trail the other day just to see how immediate that was, and it is very immediate.

Now, what can we do?

[01:00:00] Well, we could denude the park of trees. I'd rather not spend much of my life hugging trees, but it is an option. I very much want an ignition detection camera on that, and of course we have other mitigation issues. We can add insulation, we can do undergrounding, et cetera. But I recognize that this is a significant risk area.

Now, if we look at this, our little commercial area in Sellwood is right in the middle of that, so you can actually walk from Papa Hyden over to the escarpment. In fact, as I was parking my car for dinner a few months ago and a deer came out to look at me. Well, the point is we're not very far from wilderness.

Technosylva is mentioned in the PGE plan, but not specifically. We've talked about the cameras. We have infrastructure risk there. I don't think it is the level of the risk at Forest Park, but as I repeat it again, the number of people and structures next to it are much greater. So that's a siloing issue we need to address.

[01:01:00] As I said early on, there are no villains in this story. This is catching up with events that we never had to deal with before. So where are we? Well, we're less than a mile, and if we follow lessons from the Eaton fire, that's less than 30 minutes. So as I said to some of our neighbors, if you see the alarms go off, walk East. Hopefully none of this will ever happen.

But the lessons of the LA fires are that this does happen. We desperately need to invest in our mitigation measures along the east side hillsides.

[01:02:00] Should we call Ron Wyden? It's easily done. He lives right over there. Or Representative Dexter, she lives right over there. And I've talked to both of them. I've had breakfast with both of them to walk through. They're excellent. I'm an old friend of Ron Wyden's. He was central to the Enron investigations, but this is not bringing a political problem, we need to change our rules is what we need to do.

It's probably something we'll have to do on the city level. I don't think there's anyone in opposition to the concepts I've raised here now, but I think there's a lot of education that needs to be done. I've been walking through the new commissioners one by one and generally gotten a good response.

[01:03:00] So, this is the common sense of catching up to a different world. The only way to have jokes in this sort of presentation is to make fun of yourself, I got to say. So, what is to be done? We need a vastly more proactive regulatory approach.

Hindsight is precise. You've just heard hindsight here, but it's not the right answer. Pricing of right of ways needs to be changed. Allocation of risk needs to be changed. The shareholders in all of this need to sit in the same room. The

guys in Altadena should have been in that room when they built that transmission line.

[01:04:00] Well, that's getting better. We have a new form of city government. It's going to be more efficient, I believe, than the old one. I can say that after 20 years of sitting on city council committees, which are always entertaining. Okay, that's it.

[01:04:19] **Speaker 15:** I'm from the community of West Linn and about 15 years ago, analysis was done showing three neighborhoods in West Linn that are at risk. So my husband and I contacted a number of different organizations. The Firewise, TBNR, the City of West Linn Parks, department of County Soil.

[01:05:00] We came up with a format of removing invasive species and fuel load out of the steep canyon across the street from us. We worked on that collaboratively for about 10 years. Then the ice storm went and undid everything we did, but we went back. Except for the invasive species we had managed. So, we had the city bring in big vans.

We pulled up and one neighbor got upset at what we were doing. She went through the different levels, the neighborhood association, the parks department, finally worked her way up to the city manager and was able to bring all that we had done to a screeching halt. All we can think of is that, and my husband and I were the volunteers, and we worked with salt.

[01:06:00] It was heartbreaking to know that one person threatening litigation could stop the litigation on preventing wildfires in the community. I don't know, you mentioned education and then in the city was pushing action. Our work was profiled in the West Linn Tidings twice on the front page, and we still were stopped.

I don't know, I don't know what your input on that would be.

[01:06:10] **Robert:** Well, we've just been through the same process and more with invasive species and education and volunteers. It's awfully hard to go from the bottom up, and it's even harder when you're talking about stuff that has not been identified as an immediate emergency.

I had a central role in saving the three giant sequoias across the street, and that was scary enough that we could get a hundred neighbors out. But when you're trying to talk through things that may be next year or the year after, it was very

hard. So that actually has to be a city council issue. Why does one work on something like this?

[01:07:00] Well, frankly, the easiest way is to talk. The mayor and through the press, you didn't hear me say that. So I'd like it if I can, after 20 years of neighborhood activism, do better than that. There's a wonderful book by Saul Alinsky, a mentor of Hillary Clinton's, a brilliant activist. If you send me an email, I'll send you a reference.

But it's tough. You have to be really, really aggressive. I'd like to be smarter than that.

[01:07:54] **Speaker 20:** Thinking back to Sam Insull and the bias for inaction in regulation. Are you aware of any sort of regulators that take into account counterfactuals or what happens if there is inaction when proposed policies?

[01:08:15] **Robert:** Well, obviously yes. The problem we have is that our system is baked into the laws having to do with cost plus regulation, and rate cases, and proofs, and the rules of evidence are not something a regulator can easily change. That required changes in the legislature. What I can say is we would've invested a lot more in mitigation.

You must be very aggressive to take that approach, but I'd like to be smarter than that. Still, it's taken me over a year to get our local neighborhood efforts on an alternative track. But that effort has had a result which this is environmentally excellent.

Why is it so hard to get utilities to act in anticipation of infrequent but costly adverse events? Consider again our long-established legal systems and procedural customs set up in Samuel Insull's day, and the resulting bias for inaction in regulation. These systems have cost-plus planning essentially baked in, with laws establishing regulatory practice and the conduct of rate cases, standards of proof and rules of evidence. These constraining rules are not something regulators can easily change, rather requiring difficult political action by legislatures. In this challenging legal environment, how should we handle wildfire risk? We want to start by basing utilities' budgets on forecasts of intelligently calculated costs of contingent events. That is pretty tough. I started at Portland General Electric as a manager in the rates department and I probably would have disagreed with myself then if I heard myself here today, suggesting that it is reasonable to allow the utility to charge customers for preparations against unlikely but expensive contingent events. But the world has changed.

If you consider the number of billion-dollar disasters described in Dr. Smith's studies, they seem to be occurring at an exponentially increasing frequency. This is simple physics. According to our statistics, the average temperature in Portland's south side has been increasing by about 1.7 degrees Fahrenheit every decade. It is an unfortunate fact of human nature that we find it politically difficult to prepare for infrequent disasters.

That fact dominates a lot of our risk management analysis in finance and economics. I have no illusions about the political difficulty of these issues, but I do have answers to some questions, and am always ready to talk with the makers of public policy. I do believe I can effectively explain some solutions and readily accept recommendations of people I should talk with.

How relevant are county governments in addressing wildfire risk? Multnomah County does have a plan for one Pano AI camera, but it has not been installed yet. There is a sometimes-strange balance between city and county entities that complicates productive action, for example, in the often-inconsistent actions addressing homelessness.

Insurance companies are very relevant to questions about action in preparing for wildfire risk. Though, of course, they are not always the most pleasant people to deal with. Insurance costs are going through the roof everywhere. Whisker Labs, interestingly enough, is funded by the insurance companies who wanted more detailed fire risk data than the utilities. It is interesting to see that technological solutions are coming out of the insurance area that were not coming from utilities. As a personal note, my wife keeps saying she would sell our home in Arch Cape before the water goes up by two feet. Of course, that event is far enough in the future that I think that will probably not affect our house.

Considering the Southeast U.S., we are realistically going to price people out of the Gulf Coast and there simply is no shortcut there. And in certain parts of the East coast we have million-dollar homes threatened by climate change.

We are now the richest country in the world, in spite of its cretin with orange hair. We have the wherewithal to endure more of this climate change pressure than almost anyone else. And we here live in pretty much nicest place, which is very lucky. I sometimes wonder how I would feel about these issues if I lived in a less pleasant place. But in spite of our advantages, there are limits. Even in the U.S., there are places now populated that will be effectively unlivable in the future.

I have done many planning studies regarding utilities. My consulting business has gradually changed the way we perform these studies to include more extreme events. We have expanded our more or less standardized toolbox to include simply more events and more consequences. We are learning a lot more every day about how to conduct enlightened actionable planning. This is a learning curve and I'm amazed at how much I have learned over the last few years. I have had clients who paid us to investigate those events far in the tails of probability distributions, mainly large utilities, but also entities on Wall Street. We will need to integrate firefighter response factors in that modeling; it really cannot be standalone.

Coordination among local counties, Multnomah, Clackamas, Washington, for example, is a sore point in planning. When you look at the studies that we have, such as statewide planning efforts, they are very outdated.

For example, I know of one important study in which there are only six pages on wildfire risk. You are always hoping that the lone Ranger will ride in from the range and rescue you, but the state really has not been playing the role we might like.

We have underfunded our emergency bureau at the city and certainly at the county as well. The two agencies often do not play well in the same box here in Multnomah County, and I do not really see it being much better elsewhere.

One of our audience members related that they were provided by the State Farm Insurance company, their home insurer, a Whisker Labs device called a Ting. These devices simply plug into a wall socket and monitor your home's electrical system for faults. It tells you when power is out, or if there are various wiring problems in your home.

[01:17:10]

**Robert:** Well, I can write a lot about existing plans. Obviously, the state takes care of the trees along 99E as we go south from here and they do a terrible job. But the fact is, we really haven't focused on this because conditions have been changing continuously.

We had never seen the sky turn yellow until 2021. I have lived here since 19 77, 67, and that was a shock. And so our adjustment speed is just not rapid enough on the Ting. Not only is the Ting monitoring your house, but it's also sending the data back to their computers. And that's the data we mining on this.

[01:18:00]

And that's very valuable stuff. And Bob Campbell, who is the boss and I have a great relationship. I've asked a lot of questions. I have an NDA, so if I tell you what my questions are and his answers, I might have to kill you, but he'll die happy.

This is an example of technology helping us out a lot. Are you going to say canape?

[01:18:38]

**Dylan:** actually I have a question. and, it's not about transportation.

[01:19:00]

Okay. Check, check. thanks Robert. So my question is, as an economist, you'd encourage a valuation of the benefit of, say, undergrounding, right? So, we hear about proposals to underground, and as having worked for an investor-owned utility, you know, utilities really chase customers, right?

It seems to be a, something very important to them. So we have a lot of wind farms in Eastern Oregon. Now there's a proposal to do an underground transmission line under the Columbia River and through the gorge. And so there's environmental costs or benefits, potentially risk to salmon that people are looking at, but I, I imagine so.

Proposal like that, you would want to look at also the potential benefit of undergrounding versus above ground alternative safety forest land, and then the distribution of the neighborhood level here. Where you are proposing is looking at undergrounding, you know, under the sidewalks in the public right of way, not just for aesthetic reasons, not just to keep trees from knocking down power lines in a winter storm, but to prevent this sort of a disaster.

[01:20:00]

So how, what would it take to, to look at these, these sorts of transmission projects and distribution projects for Undergrounding with that sort of valuation?

[01:20:16]

**Robert:** Well, should give you the answer I gave this gentleman who I don't know, but you asked a good question. The costs are going to go up enormously and we're already seeing the... The fact is the benefits of far speak...

[01:21:00]

**Robert:** I'm not used to having people ask me to talk louder. Laughter. So, this is going to be a hell of a battle because we are sending the price tag off to the customers. But we're going to have to. The distribution lines along Reed College Place where I live, were built, actually after the first World War when the houses were built, they now go through the a hundred-year-old lindens, which we love, and which I've worked for 20 years to maintain.

PGE's been out twice this year doing, pruning, which is now required by the North American Electric Reliability Council and corporation. So that's in place. But it's also true that the lateral lines that cross the park strip are going through the trees, and those apparently are not subject to the same level of rules as the main lines go down the street.

[01:22:00]

Now, my problem is that in a hot summer, those trees are dangerous. Now the good news is we keep them well hydrated, but the bad news is that one of those lateral lines can set off a fire just as effectively. So we, when we get to the point of undergrounding, the bill, it's going to be hellish. But we're really not getting a choice.

If we're going up 1.7 degrees every decade, we are going to live through another three or four degrees in our lifetime. Even those in the room with white hair. And your kids, of course, may be seeing something even scarier. The fact is, the technology we built in Sam Insull's day is now obsolete and unsupportable.

By the way, we're energizing an under-river line in New York, CHPE in May, and that's going to be very interesting sort of course. It's the Hudson River. We don't hear about the Hudson project in Oregon, but it energizes in May.

[01:22:55]

**Dylan:** but no need there. Think for one more question. I'm told. Ask the mic.

[01:23:04]

**Speaker 18:** Okay. The risk of being unspeakably naive about this. Is there any, thought about using local neighborhood level, electrical generation as opposed to large facilities and having a transmission?

[01:23:21]

**Robert:** That's one of the interesting ironies as we know, the orange one does not believe in any of this, fake technology. But the reality is, solar generation is incredibly good.

Option is cheaper than our traditional thermal generation is operating problems because obviously the sun doesn't always shine. But as our rates go up, it becomes more and more cost effective. The last time I checked for our office, it just about penciled out. That was three or four years ago. But with the current rate increases, it may have. Created over in California, the expansion rate has been enormous and in Texas, and we have other technological changes that are very positive. The wind farms are also very expensive. Battery storage has been explosive... While that's a bad.

[01:24:00]

We are planning more battery storage in 2026 than we ever had before, so there is good news. I'm not moving to Mars. I'm perfectly happy where I live, but I am ready to say that we roll over sleeves and make some changes.

Thanks everyone. This has

**Dylan:** Thanks everyone. This has been the Roast of Robert McCullough. Thank you.

[01:25:00]