Even Old Houses Can Learn New Elec-Tricks

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Greg Dalton: I'm Greg Dalton,

Ariana Brocious: I'm Ariana Brocious.

Greg Dalton: And this is Climate One.

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Greg Dalton: The Los Angeles wildfires have just shocked and saddened so many people. Homes burned, lives lost, tens of thousands of acres torched, lives destroyed. I have many friends and family who are there very close. The tragedy is immense.

Ariana Brocious: Yeah, I'm with you. I just really feel for people who are suffering right now as a result of these fires, which were surprising and scary and moved really fast and I think have caught a lot of us off guard Obviously people in Los Angeles, but even the world watching just how quickly they've moved the fact that they're happening in January Which isn't part of what we've long thought to be the normal fire season But the science is clear. Climate change has led to these extremely dry conditions that didn't used to happen in January in Southern California, and that's what's fueled these fires.

Greg Dalton: Yeah, burning fossil fuels heats the air, turbocharge the winds and dries out the land. We know this. Once those fierce winds come along and there's a fire ignited, they spread so quickly. Firestorms like these are very difficult to contain.

Ariana Brocious: And this isn't something we're just going to fix overnight. I mean, these conditions were brought about by decades of different types of policies and climate changes. And so now we're seeing the effects bear out, um, and changing those things is going to take a lot of time as well. In the meantime, there are things people can do on an individual level, to help. One of those is

to harden your home against fires. If you live in a fire prone area. We did an interview on this with Nick Mott last year. You can find a link to that in the show notes on our website. There's lots of other resources as well.

Greg Dalton: This week we're talking about a different kind of home improvement, though in a way we're also talking about prevention. If we don't want catastrophic wildfires to keep coming ever closer to home, we have to reduce our carbon dioxide and methane emissions.

Ariana Brocious: And while we know a lot of that has to happen at a very high level at a systemic level, again, there are things you can do as an individual, especially if you're a homeowner, and not just help the climate, but really improve your own life. If you include your personal cars, along with things like your water heater, your stove and your furnace, collectively, more than 40 percent of U. S. emissions come from us at the home level.

Greg Dalton: Right. And some cities are starting to support that change. Last year, the city of Los Angeles passed an ordinance that all new homes built in LA must be all electric. That means no gas hookups, no methane gas. That saves money for builders and makes the homes cleaner for residents.

Ariana Brocious: Right. And really, no matter where you live in the country, there are things you can do right now to make your home cleaner and healthier and more comfortable. And most of that revolves around electrifying, getting away from fossil fuels.

Greg Dalton: So today we're going to talk about ways you can electrify the home you live in right now. Ariana, I know you've electrified aspects of your home. What's been your experience?

Ariana Brocious: It's been up and down, um, and I will say to be quite honest, part of this was sparked by one of my kids being hospitalized for asthma and feeling really scared and realizing that they, the bedroom that they slept in was very close to where our kids were. gas, hot water heater, and our gas furnace were located. Um, of course they were vented as they're supposed to be for safety, but I was just, I couldn't get over the idea that somehow this was contributing. And so, um, we took on the effort of replacing those. We had to get a lot of contractors, a lot of bids. Some people didn't understand the kind of technology, like a heat pump that we wanted. But overall, it's been so rewarding because the appliances we have now, a heat pump, an induction stove, electric water heater, just run better. They're quieter. I love cooking on my induction stove far better than gas stove. It's just nicer. And Greg, you've done some of this stuff too.

Greg Dalton: I started with solar panels more than 20 years ago, but recently induction cooktop, which is fabulous only had to swap out a few pans It's fast boiling. I don't do a lot of fancy cooking but boiling water and pasta is really fast. Swapped out my gas water heater for an electric heat pump water heater. The key there is to do it before it breaks. Mine was about 10 years old, near the end of its life, and did it before it broke because it took some time to find an installer. There's tax incentives to navigate. Overall, it was a very positive experience. We have hot water, clean stove, and everyone's happy.

Ariana Brocious: Hot water is key. And I live in an older home, as many of us do, and part of where this episode idea came from was frankly the show, This Old House, that's been on the air for decades and has done a lot to educate the average homeowner about how they can keep their old home, whatever vintage that happens to be, in good working order. And increasingly, they've been embracing this era we're in, you know. Talking about things like heat pumps and net zero homes and solar. And so I really wanted to bring that approach to today's episode and help average people understand what are the things they can do to make their home more comfortable, more enjoyable to live in, without having to do a major overhaul of their entire house. So I was really excited to have

this conversation with Ross Trethewey, a home technology expert from This Old House.

Ross Tretheway: So anytime you're dealing with an existing house, you have to figure out where the kind of the energy is being used because if we want to make it perform better, uh, we have to reduce the energy use of that building. At a high level, the big one is the HVC, you know, the heating and cooling loads of a building. And so that's where we'd like to kind of start. And so to do that, you have to think about, all right, what contributes to the heating and cooling loads of the building? Of course, there's a lot of things, right? Outdoor climate, some of the stuff you can control, some of it you can't control. So what can you do? First thing is air leakage. That represents anywhere from typically 20 to 50 percent of the heating and cooling loads of a building. So that's just air leakage happening, from inside to outside or from outside to inside.

Ariana Brocious: So gappy windows or not having weatherproof strips on your door?

Ross Tretheway: Exactly. So air leaks around windows and doors are the ones that people focus on, and those do matter. But the bigger ones, and the ones that we like to focus on, is the top of the building, the attic plane, and the, what we call the rim joist, or the basement sill. Where the foundation meets the wall. That is a very, very leakage prone area because you have typically concrete mixing with wood. Um, and if you think about it with stack effect in buildings, like, so if you think about like, if you heat a building and it's cold outside, hot air wants to rise. It wants to leave through the attic, or into the roof, and out to outside, and as the building leaks that air, you have to replace that air. So what goes out must come in, so when does that air come in? It comes in from a low point. It's typically at that rim joist, at that foundation wall to wall assembly connection. And so, we seal those up a lot.

Ariana Brocious: Essentially you want your house to be relatively tight, right? Because if you're going to be conditioning that air, making it hot or cold or whatever, you don't want to lose it all.

Ross Tretheway: That's right. That's right. You could either, like I would say, you could produce more energy to that house or you can consume less. Consuming less will always win. , from a resource perspective, and the same is true of air leakage. If you have a really leaky house, then you have to add more heating or add more cooling energy to replace that energy that's being lost.

Ariana Brocious: So another thing in this category would be adding insulation, right? And I know living in an older home myself, my house was built in the 50s. The walls aren't really insulated. It's a brick house. And just a few years ago, we added a lot of new insulation to the attic because it had, whatever was there originally had essentially compressed to effectively nothing.

Ross Tretheway: Yep. Yep. Yeah. So, first thing, just to be clear, is, is air sealing, and the second thing is insulating. And a lot of people get those confused, they add the, the pink fluffy stuff, or the cellulose, or whatever insulation they're thinking about. And those are not air sealing methods. Those are just insulation methods. So I think of like, having a windbreaker on and adding a wool sweater. air seal first. That's sealing up those cracks, the attic plane and the room joists, et cetera. And then we add the fluffy stuff or the insulation to seal that up. And that both of those are DIY friendly. You could go to an experienced weatherization contractor and, you know, and obviously subcontract that out. That's totally fine. A lot of people do that. And a lot of those are under some of the utility programs and rebate structures within the local municipalities and where you're located. There's different kind of incentives and advantages to do that. But some people just want to DIY it, and that is totally fine to do. Everything can be purchased local at the hardware store, etc.

Ariana Brocious: And then the next step is really what you're using to heat and cool that air, right? The HVAC, the heating ventilation system. And so I want to talk a bit here about, otter. A ton of

attention paid to heat pumps. I think they've gotten a lot, at least in the climate sort of space, , because they can be so effective and efficient. They don't work great everywhere. And I know you've worked on some videos to help people understand what to consider if you think about getting a heat pump for your house. So can you give us some pointers there?

Ross Tretheway: Yeah. Yeah. So heat pumps are the craze. Heat pumps are awesome. We love them. but we also wanna make sure that they get properly applied and installed. And so it's worth taking the time to kind of explain the different heat pumps that are out there and kind of where they fit and where they don't fit, in general, heat pumps have four different categories, air to air, air to water, water to air, and water to water. So the water to stuff is all going to be geothermal typically. So we could parse that aside for a second. So you have air to air, which would be like mini splits, right? those could be ductless heat pumps. Those could be inverter units, from Asia or from either the U S market, but that's an outdoor unit. that kind of grabs that heat from outside. And then there's the indoor unit that distributes that heat to the inside. There's also air to water. So there's an outdoor box that grabs that heat from the outdoor air in the heating mode and it converts it to hot water. And the hot water is piped into the building and used to heat the building. And so they're kind of, they have the same kind of guts in terms of how they work, generally speaking, but they do it with two different heat transfer mediums. One's with refrigeration lines running in the building. Um, and providing heating, you know, through, through that system. The other one is using water based, you know, and so that can be hot water for radiant floor heat and radiators and baseboard and fan coils, et cetera. And so when you have an existing house, let's say a retrofit home. Let's say it's got a oil boiler or propane boiler in the basement that's doing hot water heat, which is very, very common in the Northeast and the Pacific Northwest and some areas in the Midwest. Those are set up really nice or could be set really nicely for an air to water heat pump strategy because the air to water heat pump is like a low temp boiler. It's a heat pump, but it only produces low temp water, meaning it might be 120 degrees, maybe 130 degrees, really max 140 for the current technology that we have. And so you can use that to basically offset the heating load of the building for the majority of the year. And if you're in a really cold climate, you might need that backup fossil fuel system just to kick on for those small amount of hours that we're at that really cold condition.

Ariana Brocious: right so they're they can be really effective in a lot of climates. Some of them it's a bit more challenging and the type can vary. There's a lot to understand. But heat pumps, very notably run on electricity. How does that efficiency compare to a traditional either electric heater or AC unit or I mean, I think the important point is a lot of people are looking to electrify their homes to get away from fossil fuels altogether. So if you have a unit that currently runs on gas and you don't want that, a heat pump might be a good decision.

Ross Tretheway: Yeah, so if we've got the sizing right where the heat pump can handle the whole heating load and the whole cooling load of the building, then to me that's like a slam dunk. You can jump to an air to water heat pump, you know that example. And you can get rid of the, the fossil fuel boiler, whatever that may be. You can get rid of that furnace or whatever you have as a backup system. It can run on the electricity, can run on that heat pump. And then you can do some creative stuff like you can add solar, right? And then you can have kind of the marriage and the synergy between, you know, you have a roof that's now producing electricity that the heat pump uses to heat and cool your building. And that's where you can get to like really like net zero, type of strategies. So you can reduce the carbon. You know, for, you know, for the life of that system, but you also reduce the operating cost, you know, as soon as that goes in, because you, you basically have a real synergistic relationship between the sun producing electricity and the energy use of that building.

Ariana Brocious: Mm hmm. Mm hmm. You mentioned solar panels and this possibility of kind of having solar on your roof, which then powers effectively everything in your home, if you get the right sizing. and that can be really appealing to people who want to either be off grid or who want to do

some kind of net zero or just really minimize the electricity that they're getting from other sources. You've also produced some videos for This Old House about some scams because there's a lot of incentives that have been put out into the marketplace. And I have had people come door to door in my neighborhood trying to sell me solar. And it's really, um, kind of galling, like it's, it's not the kind of product I think you can sell door to door exactly. So what should people be on the lookout for and if they're interested, what should they kind of steer clear of?

Ross Tretheway: The high level is that number one, you want to make sure that you're dealing with a company that is licensed, certified and definitely not a bank or a front lead generation service for solar. You want to deal with a company that lives and breathes solar. Hopefully they're in the local marketplace and been in that marketplace for a long time. So there's no better strategy than word of mouth, talking to friends and family and other people in the local community to figure out, Hey, who installed your solar? Did you have a good experience? There's nothing better than that. And so if you're, you know, depending on the marketplace, we, you know, in our, in our market, we know who those players are. You know, they're typically family run businesses. A lot of them are small business, uh, based. They're in it for the right reasons. And we've had great success on projects where they're involved. I'm not to say that the larger companies don't do a great job, but a lot of them, to generalize, some of them are not, owned by the actual name that you think that they're owned by, that there's a company 3000 miles away that actually owns that, company. And so that the, the big part of that is finding the right company, number one. Number two, you have to have the right size system and the right roof, orientation and construction and age to make it work. So, we've seen a couple instances where solar was installed on the north facing roof of a building. And I don't know if you've checked, but the last time I've seen the northern facade of a roof get some sunlight is, uh, has been never. Um, so like that's the type of stuff that's a real head scratcher. And you know, just because you installed a 10 kilowatt solar system doesn't always mean that you're going to get the actual output that a 10 kilowatt solar system should deliver. And so, having it installed on a relatively new roof, ideally it's at least 10 years old or newer. Cause lasting these, these panels are gonna last 30 years. The next one is if you're going to be in the house, if you're going to be in the house and you're going to sell it for the, in two to five years, I wouldn't recommend solar, you know, the typical ROI or simple payback for these solar arrays. Is typically five years, maybe 10 years, depending on what marketplace you're in. And that's really a function of your utility costs for electricity, and the rebates that are available in the local market, And so if you're going to only be there for three to five years, it doesn't make financial sense to do it.

Ariana Brocious: Yeah, and you're right, though I will jump in and say, I think talking to people in real estate, it is still often considered a selling point and an asset, a paid off system, system that the previous owner has already purchased, that's attached to the house, because it's a hedge against future electricity prices, right?

Ross Tretheway: Yes. The key caveat there is that it's paid off.

Ariana Brocious: yeah. And as you say an average homeowner may only spend five to ten years in their house. This isn't always going to be the situation for everyone, but one of the things I like about this old house as a, as a show and a program is it really does try to educate an average person how to do a lot of these things. I'd like to talk about this segment you did on a new build subdivision in Austin, Texas, and it's kind of like a whole net zero mini city. They've done a tremendous amount of work in laying, excavating trenches and so forth to do geothermal piping throughout, um, That also allows for fiber internet. And so because they have this economy of scale, the home builder talks about that they're able to sell these even below a little bit, the sort of average market rate. And they're very nice homes. And so I was stunned. I think that's really a nice example, but I'm curious if that's like a kind of one off or if you're beginning to see more of that green energy efficient building taking off around the country.

Ross Tretheway: We are starting to see a lot more developers and builders starting to get more plugged into energy efficiency. That is definitely a growing trend. We're really happy to see that. The Austin project was really kind of state of the art at the time, and I've heard of other developments like that, that are now in place, or being built right now. So hopefully it's not a one off and will continue to grow.

Ariana Brocious: Ross Tretheway is a home technology expert with This Old House. Thank you so much for joining us on Climate One.

Ross Tretheway: Thanks for having me.

Greg Dalton: Coming up, why electrifying single family homes is so important.

Ari Matusiak: 80 percent of American households are single family.

So it's the vast, vast majority of our housing stock. It is also the hardest part of the problem to solve.

Greg Dalton: Stay with us.

Ariana Brocious: Help others find our show by leaving us a review or rating. Thanks for your support!

Greg Dalton: This is Climate One. I'm Greg Dalton.

Ariana Brocious: And I'm Ariana Brocious.

Greg Dalton: We talk about lots of ways we can cut emissions on a big scale. But inside our homes, the path to reduce emissions is electrification.

Ariana Brocious: And electrifying everything offers more than just reduced emissions, it's often more efficient, cheaper and better for our health. Plus, a lot of these new tools are just better. I used to think cooking with gas was great, until I got an induction stove.

Greg Dalton:But it can be a challenge for people to navigate all this new technology. That's where organizations like Rewiring America come in.

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Greg Dalton: Rewiring America got it start in 2016, when co-founder Saul Griffith used a grant by the U.S. Department of Energy to map the energy flows in the U. S. economy. Rewiring America Co-founder and President Ari Matusiak takes the story from here.

Ari Matusiak: he found that there were effectively a billion machines that were cut across all of our households that we were relying on in our day to day lives to heat our air and water, to cook our food, dry our clothes, how we got, got around in our cars. Those billion machines, comprised 42 percent of energy related emissions in the United States. and so as soon as you kind of understood that, it creates a bit of an aha moment, which is to say, well, no way we're going to hit our climate targets unless we go after that 42%. Which means we are necessarily having a conversation with, the American household and their kitchen table decisions. But the other thing about that was if we really focused on those kitchen table conversations, we also weren't really just or even primarily having a conversation about climate. We were talking about households getting things that worked

better, that performed better, , that saved them money, that made them more comfortable and healthier and, , that frankly delivered a bunch of economic value back to the communities where they lived and created a bunch of jobs that couldn't be offshored or automated. And so Rewiring was born from that kind of like core thesis.

Greg Dalton: And Rewiring America recently published a report that found that if American households electrified those, I guess, those billion machines you're talking about, moving away from methane water heaters to induction stoves, those sorts of things will result in about 40 billion worth of health benefits every year by reducing pollution and fine particulate matter that causes asthma. So how did you come to those findings?

Ari Matusiak: We have a whole machine learning model that is, that is tied to the 129 million American households in the United States. We call it the cube, , and so we've layered on top of that core understanding about the, about sort of the transition, , of going from the machines people have to these better electric ones, and then started analyzing that from the perspective of, of what those health benefits could look like as a result of the reduction in pollution.

Greg Dalton: Right. And I remember learning from Saul also that, in that transition we'll use more electricity, but less total energy because these electric, uh, appliances are far more efficient. You know, our cars waste a lot of energy and heat. Anyone who's touched the hood of a gasoline car knows that it's hot and this lets a lot of wasted energy. So this narrative has been very, it's cleaner, it's, it's better, it's more efficient. But electricity prices are rising in California and Oregon and other states. And that's really putting some headwinds and challenging this narrative that electric is always going to be cleaner and cheaper. So how's that affecting your work? This upward pressure on, energy prices?

Ari Matusiak: this is a really important point, because,we're talking about moving from, What is sort of definitionally inefficient sources of energy, because if you just think

Greg Dalton: Burn burning stuff, right? Burning is, yeah.

Ari Matusiak: You have to mine the stuff that you're burning in terms of like pulling it out of the ground and refining it and putting it in pipes and delivering it to people's homes. And once it's burned, it's gone and you need it again. Whereas if you create a solar array or a battery or whatever else, you still have that in your home and you're just sort of recharging it. So the, like the, the core energy matter is persistent, not vanishing. And, and the machines that rely on that electricity with technology that exists today, is three to five times more efficient than the, than the fossil machines that they replace. So when you think about it that way, you have stuff that's three to five times more efficient using abundant energy sources. It should be cheaper. But in some places in the United States, if you installed one of those machines in your home, your bills would go up. and the reason for that is actually because of policy choices that are being made that cause electricity to be more expensive than fossil fuels. And so, the way we kind of think about it is two fold. One, there is a future that is available to all of us with technology that exists today , that can lower our bills by more than two thirds, our energy bills by more than two thirds a year, and have all these other benefits, health benefits, comfort benefits, community economic benefits. That's available to us all today. And we're talking about with respect to machines that we are going to be getting anyway, like we're, you know, replacing a water heater, replacing your furnace, or dealing with your air conditioner, etc. And so that's a transition that we should all be pretty excited about because of the benefits. And, where the math is not working for families, we have to be focused on fixing the rules so that it does work for families, because , that's not a technology issue, it's a policy issue.

Greg Dalton: Right. And so that's where we get into, utilities, kind of capturing local, regulators,

that sort of thing. And kind of a lot of, uh, regulators are kind of in the pocket of, of their local utility. 'cause there's a cozy relationship, so, okay. So the rising prices is more of a policy problem. Don't fault the technology, solar, wind, et cetera. It's not their fault. You tend to focus on single family homes, around the country as a place, kind of the typical, I don't know, suburban, you know, with a driveway and a garage. , so why do you focus on that as your starting point for trying to move these a billion appliances and machines to electric?

Ari Matusiak: So we think about all the households in the United States , and we're really focused on, you know, at the, at the broadest definition, rewiring cares about, everything on the demand side, how you're heating your church, where the energy is coming from for a school, all of that.

Uh, we care about all of that. but we're really focused on households because, it has the most direct bearing on people's day to day experience, obviously, and their bills and, and, and how they can be so much better. And we certainly Um, I think in the political conversation over the course of this year in the United States, people are worried about that stuff. It's on their mind, inflation and the price of living, the cost of living is on

Greg Dalton: Mm hmm.

Ari Matusiak: and so this is a way to be directly going at those concerns and helping to alleviate them. and then when we think about sort of like within the households of the United States, those 129 million households, 80 percent of American households are single family. So it's the vast, vast majority of our housing stock. , it is also the hardest part of the problem to solve because it's an individual decision point every single time. As opposed to a multifamily building where it's an owner who is maybe renovating a whole building or sort of, uh, or, you know, kind of like gutting and rehabbing it. In this case, what you're really talking about is a family sitting at their kitchen table, deciding. How to replace and pay for the water heater that just conked out.

Greg Dalton: Right. And actually, I'll just say when it conks out, you're in trouble because I've replaced my water heater recently before it conked out. It was at 10 years. I thought it was going to conk out pretty soon. And it took a lot of time and a lot of effort. And frankly, I mean, I'm, I'm a kind of an energy nerd. I do this for a living. And it, it was, it was complex. Like, where am I going to get, okay, am I going to buy an established brand, you know, that has been making water heaters for decades or some new brand that is all electric? I'm like, well, is it going to break? Is it going to work? Where am I going to find an installer? All of that. Oh my gosh, there's all these federal, state, regional, local incentives. How am I going to navigate all that? It was pretty darn hard and complex. And I didn't have a family saying, screaming for hot showers. I had time to do this. And I'm curious about what's the business model or a space between a homeowner, myself, who has intent and emerging complex field where there's kind of the legacy installers who are been installing gas appliances for decades and, and rapidly changing technology, what are the tools people can go to?

Ari Matusiak: So that's what we're building So if you go to homes. rewiringamerica. org you can find an incentive calculator to help you understand sort of all that's available for you And you're based on what you're trying to do. And we also have a planning tool that helps you navigate based on your household what Is the right upgrade that or set of upgrades that makes sense to you and we'll be able to connect you to a contractor. And we'll be able to connect you to not just those incentives, but to financing. And so our vision is to make electrification easy for all households, to make it affordable, and, and to make it a desirable because it's a better experience, and what you just said is so important because the status quo , reproduces a fossil fuel outcome because the market is super fragmented, and so, our belief is that by, by bringing the value proposition together and making it easy for households to navigate that, it builds momentum, uh, so that, if you didn't have the intent and the planning and your water heater conked out, a contractor would still be able to talk to you

about that option because they've been selling enough of them that it's now in their interest to talk to you about that on their own.

Greg Dalton: right? Cause I got the sense from some installers like, uh, this new electric things, I'm not so sure I don't want to install it and have you call me back unhappy or they, you know, they, they want to go with what's familiar. let's talk about another part of America. You say 80 percent live in single family homes. But there are people who live and even own condos in cities. Um, you know, my family has one and it was another painful experience trying to, you have to get your HOA. You gotta, gotta get your neighbors to agree. Like, are we going to put solar on the roof? Hmm. You know, does that mean we all have to get separate meters? Oh, what's the time horizon to pay for that? Oh, we just installed that boiler. Let's. You know, let's let it run and then calculating the cost from switching from gas to electric. So talk about multi dwelling buildings, because there you got to get a whole bunch, you got a collective action problem where a bunch of people got to agree who's going to pay up front. It's complicated.

Ari Matusiak: Right. My sort of basic take on this is that, we have to activate the transition in the market, right? We're in a place where we have status quo and inertia, and we have to get to a better place that delivers better outcomes for everybody. And getting from here to there is not going to be, always the shortest and most direct path like we're gonna, they're going to be all these different example use cases where they're, the complexities are different and the, and the change needs to be different. But what is true and at the core, and our belief about this is that if people say, you know what? I understand. What the better outcome is and I want to lock into that better outcome not a worse one because every single time we get one of these things they last for 10 15 20 years And I don't want to have to wait for 15 years before I can have a shot at getting the better outcome. It helps to organize the conversation that happens in these, you know, multi dwelling units It helps to organize the conversation that happens around the kitchen table for a family themselves. And what ends up happening as a result is technology gets created and solutions get created to deal with this. So in multi dwelling buildings, there are now, a number of companies that are out there that are creating solutions that basically take this rooftop solar and can individually meter it to every dwelling inside of that building. Even if there aren't individual meters going to the building, can still produce a bill based on your power use in your condo versus, you know, having you have to basically pay for somebody else's power use down the hall. that didn't exist five years ago, right?

Greg Dalton: Yeah, that that's cool. I wish I'd known about that because we ran into exactly that problem, right? These sorts of so technology solving some of this because every building's different, right? And it's like, yeah,

Ari Matusiak: Every building is different. Every geography is different. So an HOA in one market might be running into obstacles from a, from a permitting and, and otherwise perspective to get a job done. And another HOA in another market might be getting massive incentives to make the transition. So it's splotchy, but it is also, I guess the way I kind of think about it, it's splotchy today in a patchwork and there's a bunch of inertia to overcome. The transition though is inevitable, , because the stuff that we're talking about is just better.

Greg Dalton: Well, one of the obstacles is just labor supply and we need, like, uh, you know, what a million more electricians in this country. and part of. this debate we've been having about elites, you know, we've devalued people who work with their hands. We all want to be knowledge or brain workers. So what's the prospect for just having enough people who can install these things? Say demand goes up as you predict, there's a shortage of labor to get on the ground and put these things in.

Ari Matusiak: Yeah. And I've thought about this for a long time as sort of a classic chicken and egg

problem. if you don't have enough demand, you don't have enough sort of supply to, to deal with demand, where do you start? The way we think about it is that it is really important to aggregate the demand first. and so in the chicken and egg dilemma, I guess we're choosing to be the chicken. Because if you aggregate the demand and you have a consistent signal, it starts to make the business case for what are effectively small business owners to invest the time. and the resource into training their team and hiring people who can do that work. Keep in mind that the contractors we're talking about, , from the electricians, to the plumbers, to the HVAC folks, , to these installers, the vast majority of them, are small businesses. And, I believe a few years ago, the stat was that 85 percent of these home improvement contractors do less than a million dollars of sales a year. Well, if that's the case, you can't say to a small business owner, I have this hypothetical thing that is going to be so great for you and you should spend real money now to get ready for it. They're not going to do that. They're trying to make payroll. But if you can show that there's a line of customers out the door, , that want that thing, of course they're going to be excited about that opportunity and want to prepare for it.

Greg Dalton: There's the other part of this, this sounds like a very elite conversation for people who can afford new equipment, and who own their homes. Your organization has also been working to support electrification of low income communities and a coalition called Power Forward Communities that includes Habitat for Humanity, United Way and others, was awarded $2 billion from the Greenhouse Gas Reduction Fund, to support affordable decarbonization of homes and apartments across the country focused on low income and disadvantaged communities. So what does that actually consist of and what have you accomplished so far?

Ari Matusiak: What we've really been doing over the last several months is getting ourselves organized. Because the, the most important thing to do is to roll this out correctly and well. So we're in the process of selecting some initial communities to start in. and the idea is, across our coalition, to work with our partners at the United Way to help create local awareness, with our partners at some of these other organizations like, uh, Local Initiative Support Corporation, or LISC, which is one of the largest multi family, uh, non profit housing developers in the country, to train contractors in those, in those areas, to work with Habitat for Humanity to build new houses in those communities, and to help existing households sort of access these opportunities. And so we're really excited about that. And I think, the basic idea here is a consistent one, which is you can have incentives and you can have resources that are needed in order to make, these projects go forward. But the money alone is not enough. You need to sort of organize the value proposition in a way that's understandable to people , that they can rely on and trust in. And, they can easily find and be educated about.

Greg Dalton: Well, and do you even have the money because right now we're in a political situation where there's an attempt to claw back or impound and to not release funds like this. So how are you navigating that uncertainty? And do you advise that people like, Hey, do it now because this stuff might go away?

Ari Matusiak: Yeah. I kind of take a, a little bit of a zoomed out perspective on this, which is to say: the Inflation Reduction Act was a massive piece of policy and incredibly important. And it is designed to deliver value to American households and communities. and it's been very successful, by the way. 3.4 million households accessed those tax credits in the first year of the program in 2023. And they accessed those tax credits to buy things that are saving them money, on their bills and to buy things that they chose to buy, right? So it was at their option.

Greg Dalton: No government mandates is what you're saying.

Ari Matusiak: There are no government mandates and, and the, and the thing about it is that it's

delivering value. And when you look at where the dollars are going for the Inflation Reduction Act, there's been a lot of like reporting on that. But the point here is that for households, Households in every district in the United States would benefit greatly from these dollars in terms of their kitchen table benefits from a, from a bill savings perspective and from a health and comfort perspective. And so when you start to say, oh, well, those incentives are at risk. maybe that's true in the political conversation. We'll see how it unfolds, but, but typically when incentives are available to households and to constituents and they are also being used. It's the kind of thing that people like to keep in place as opposed to take away.

Greg Dalton: Right people like carrots and there's more carrots in the IRA than than sticks so it sounds like you think it's here to stay because it's popular it's effective and there's about more than eight billion dollars of americans have tapped into to upgrade do the kind of grades you're talking about and you think it's durable because it's reasonable and possible

Ari Matusiak: I think that's the conversation we're going to be having, and, just to take, take the rebates that are part of the Inflation Reduction Act. 49 out of 50 states are moving forward with their applications for those rebates. I don't know the exact number because it's changing all the time, but a significant number of states have, uh, submitted their paperwork to the Department of Energy post the election. So, you know, we're talking about policies that help people irrespective of the political sort of map, and that are valuable irrespective of, uh, of where someone lives. And so, and that are available to people at their option if they choose to access those incentives. And so, you know, my, my hope is that we're going to be, um, uh, we're going to all embrace the opportunity that comes with those dollars and focus on delivering against them, which is what we are focused on.

Greg Dalton: Great. All right. Thanks for sharing your, uh, insights on electrifying our lives on climate one.

Ari Matusiak: Well, thank you, Greg. Appreciate it very much.

Ariana Brocious: This is Climate One. Coming up, how you can upgrade your house no matter when it was built.

Edith Buhs: There is an option that will improve every existing home in the United States that was built before 2000 that people should be considering when they're thinking about the next piece of equipment in their home.

Ariana Brocious: That’s up next, when Climate One continues.

This is Climate One. I’m Ariana Brocious.

Even if you’re convinced that home electrification is a good idea, it can be really daunting to know where to start. That’s where electrification coaches come in. Edith Buhs is an Electrification Coach at Rewiring America. And she learned how hard this process is firsthand when she took on updating an old house in Boston.

Edith Buhs: It started in 2006 when my husband and I bought a hundred year old home here in Boston. It was something that around here we call a triple decker, which means it has three apartments in it stacked on top of each other. And you know, we planned to live in it and rent out two units. And we knew we were buying a house that was certainly old, but also had some deferred maintenance and, you know, old systems. We moved in on Labor Day, all very excited about this new chapter of our lives. And by Halloween, we knew that this home was drafty and it was going to be expensive. And that turned out to be true with each incoming oil bill for our very old, sturdy, reliable

oil boiler, the amount climbed. And we called our utility company to get a free home energy audit and see what insulation we could get at a discounted price to help out this situation. And so by the spring of the year, we'd completed all that process and we had, uh, blown in cellulose and all the walls of the house, all three floors, but we'd also paid $6,000 for oil bills, which, you know, it was just making us, it made us cry. So we were really like very motivated to figure out something else to do. And given who we were as people and what we'd spent our careers on, my husband was an environmental journalist and I've always worked in entrepreneurial non profits. We planned to start a family. We wanted to kind of make the home better for ourselves, but also make it better for the future. If we had picked it up when it was a hundred years old, we wanted to make it ready for the next hundred years. And it was hard. There was just like not even a breadcrumb trail to like figure out what to do. I was exploring the Department of Energy website in layers that I think very few people go to, um, but that did lead us to find, um, a new company that was doing a sort of souped up version of a gas boiler paired with a small generator and a heat exchanger that we ended up buying and installing in the fall. And we did that after we eliminated anything else we could find as not working because our lot was too small or our house was too old or we had a slate roof. And after the first heating season with that new system and the insulation, we figured out that we had cut our energy bills in half. We'd also cut our emissions in half. Now we were paying for the heat for the whole building. There was one system for all three units, and we were pretty motivated by that. That was exciting. It was gratifying, and we figured there was more to do. We knew the windows weren't operating well and there were other challenges coming down the line, and we just started digging in and trying to figure it out. And it was hard. There were very few resources available online. We tried to find humans. We were waving a checkbook, which was something you would do in 2008, saying, like, we'll pay you. Help us. And there just wasn't anyone around. There were these little, tiny, emerging programs with a couple people in them, and we went to all of them and asked, and just could not find someone who was ready to guide us through the process of really updating an older home to make it perform in a healthy and comfortable financially feasible and green way. And so, you know, I just kept learning more on my own. When we actually did find by talking to a person, talking to a person, talking to a person that there was a program that our utility company was offering. They were looking for guinea pigs, older homes that would be willing to like go through a lot of extensive insulation and air sealing to find out what worked, what techniques were viable, what things made a difference, how much they cost, and we signed up. That kind of treatment on a home is called a deep energy retrofit, and by the end of it, I knew a lot more, and we were basically living in a giant thermos. Like, if you imagine, like, how well your best travel coffee mug works with a tight fitting lid, we live in a giant version of that, and it's great.

Ariana Brocious: that sounds so comfortable,

Edith Buhs: It is

Ariana Brocious: I have to imagine your bills now are even perhaps less.

Edith Buhs: They are less. It's comfortable. It's quiet. It's steady temperatures, it's low cost. And it was like the next 25 percent of our carbon footprint, but that was much more expensive than the first 50%. The farther you go down the line, the more you pay for each additional percent of emissions that you reduce, which is why other people today wouldn't do the same thing. We were a demonstration project to figure this stuff out. , At home now would go through like modest insulation and air sealing, like bring it up, do better, but then spend the rest of the budget more quickly on electrifying any existing fossil fuel uses or upgrading existing electric appliances to be more efficient ones as a much better path for an individual homeowner and society for where we spend our money in electrification.

Ariana Brocious: You were very much on the vanguard of this process. Obviously now you're in a

position where you're teaching others. Which we'll get to in just a second, but but before you got into the role of kind of being an educator, just as a homeowner, what were some of the high level takeaways you had going through this on your own that other people could could learn from?

Edith Buhs: I was like, nobody else is going to do this. I was like, I am highly motivated. I've got a graduate degree in public administration. Like I'm a good researcher. My husband was an environmental journalist. I was like, if we have struggled this much, like who else is possibly going to make it through this path? We have to have a better option. 80 percent of the homes that are built today are the ones we're going to be living in, in 2050, and that degree of difficulty is not going to be. anything that's going to lead us where we need to end up. So I was looking for ways to set up policies to create awareness, anything that would make use of that experience that we had. And I worked with a local Moms Climate Action Group that was amazing to work with. We worked on city and state policy. But then I really was deciding I wanted to spend more of my professional. time on this, not have it just be like moonlighting and my like activism side hustle.

Ariana Brocious: Right? It takes a lot of time right? It takes a lot of time, a lot of energy. and I think because of knowing that it's not something every homeowner's got the bandwidth to take on. Rewiring America began this program. and you're involved with this where in, in partnership with them, you've been developing and teaching curriculum on home electrification to a network of volunteers all around the country. What are some of the basics that people are learning in that course?

Edith Buhs: Yeah, it's a four week course, um, we have a weekly like everyone session that I lead and then kind of like a college course. There's, discussion sections with the regional leaders. So you get to dive into what goes on in your state and your climate, um, with people. from a shared situation and what we cover in the beginning, we talk about the basics of building science, just sort of how do we understand how homes work and how to make them work better. What's the stuff that's worthwhile to do and how do we, you know, like how do you use a home energy audit? What are you going to learn from that? How do you take action on that? And then we look at what are all the ways you can kind of take your existing uses of electricity and squeeze them down, aim for more efficiency, and then think about the new uses as you start to move from your existing fossil fuel equipment to new modern options. We spend a whole session just going into heat pumps because they're really the star player for home heating and cooling and domestic hot water. And they're a really powerful, amazing tool that's new and not well understood. And there's actually even there's misunderstandings about them too, as well as just lack of knowledge. So we spend a whole session diving into that. And the last class is about the national landscape and the federal supports that we have available now through the inflation reduction act and how to be an electrification communicator, what, how to be a coach, how to meet people where they're at, figure out what their motivations are, the challenges they're trying to address and help them figure out a plan and get them moving on that.

Ariana Brocious: And what do these individuals typically do once they've graduated from the program?

Edith Buhs: Some of those folks are involved with their local, um, like activist or sustainability committees in their towns, whether that's like Third Act or, you know, the Sustainability Committee. So they might be tabling at the Harvest Festival, they might be, you know, doing a program through their local government, or it might be a volunteer effort to provide coaching to people. And that could be just, you know, More of that sort of like tabling and one to one and doing presentations, or it might be working with an individual homeowner to say where you at, what do you care about, and then how do we lay out a path over the next few years to take advantage of each time when you're approaching the end of the life of, you know, your gas dryer, your boiler or furnace, your air

conditioning system is getting old. How do you plan for that and be ready to take action? We like to say before it dies, electrify.

Ariana Brocious: That's great. So, why is it useful or important to work with an electrification coach that lives in the same region that you do?

Edith Buhs: Yeah, well, you'd be surprised at how much changes where you are in the country. I think everyone probably quickly thinks like, yeah, the climate is different. It's colder in Michigan. It's hotter in New Mexico and it's dry there versus, you know, like the humid Southeast. That's easy to think about. But what I think a lot of people don't know is how much electricity costs change around the country and how much fuel costs vary around the country. So there are really different kinds of opportunities depending on where you live based on the cost of those energy sources. And then there's a lot of variation. Some states are much more active either through the federal government or cities and towns with the programs that they're offering than in other places. So there's a lot of localized knowledge that's really useful. to have when you're really trying to guide someone. And we're so excited that we've trained about a thousand people in a little over a year through this program and we are setting up the next cohorts for 2025. There's a lot of demand for it.

Ariana Brocious: Yeah, I was gonna ask how can someone find a coach or sign up to become a coach if they're interested?

Edith Buhs: Yeah, they can go to the Rewiring America website to sign up for the next cohort. And we also have a coach's directory and there may be a local program near you you know, one of those offerings in your city or town or through a local, you know, organizing group like a third act or a mother's out front or some organization like that.

Ariana Brocious: Yeah, there's a lot that can be done. So with the reelection of Donald Trump, there is a lot of talk about his plans to do away with the extensive tax incentives and rebates that were made available under the inflation reduction act. And these particularly are for homeowners, but there's also some that apply to renters as well. In the event that those subsidies, uh, go away or those rebates go away, what can people do in the next two to four years, regardless that can still help them on this home electrification journey?

Edith Buhs: Right. Well, I think momentum's on our side. Even if there are policy and program changes coming out of DC, I think the last five years have fundamentally changed the options and technology and prices of all of that. each homeowner can, um, find in their local market and with their local installers. We're not going back to there being the limited number of options that my husband and I faced when we looked for this in 2006. It's a different world and that I think is going to stick. The local programs and whether that's in your city or your state are going to stick around and some of those are going to be strengthened. So anytime someone is looking at a piece of equipment getting old, they should think about an electric replacement, they're going to find that that is safer. It is healthier for the inhabitants of the home and all of us inhabitants of the world. And you're probably going to end up a little more comfortable too.

Ariana Brocious: Great. Well, thank you so much for giving us some ideas, , and your own story of this electrification journey. And we'll put a link in the show notes for people who want to find out more about the resources you talked about and how they could become a coach too.

Edith Buhs: Yeah. Great. It was good to talk to you.

Ariana Brocious: Edith Buss is an electrification coach for Rewiring America and a decarbonization advisor at Abode Energy Management. Thank you for joining us on Climate One.

Ariana Brocious: And that's our show. Thanks for listening. Talking about climate can be hard, and exciting and interesting — and it's critical to address the transitions we need to make in all parts of society. Please help us get people talking more about climate by giving us a rating or review. You can do it right now on your device. Or consider joining us on Patreon and supporting the show that way.

Greg Dalton: Climate One is a production of the Commonwealth Club. Our team includes Brad Marshland, Jenny Park, Ariana Brocious, Austin Colón, Megan Biscieglia, and Ben Testani. Our theme music is by George Young. I'm Greg Dalton.