Net Zero Homes and Waste

https://www.climateone.org/audio/net-zero-homes-and-waste
Recorded on April 16, 2015

Greg Dalton: This is Climate One, changing the conversation about America's energy, economy and environment. I'm Greg Dalton. The topic today is the power of Zero, homes that produce as much energy as they use have moved from fantasy to reality. Are Net Zero energy homes trophies for wealthy people? Are they within the reach of the middle class? We'll hear from a person who lives in a Net Zero home and ask him what kind of clothes he wears around the house. If Net Zero is not for you, we'll also hear tips for making your home more energy and water efficient. The second half of the show we'll talk trash. Oakland, San Francisco, Los Angeles, and other California cities have set goals of eliminating all waste that goes into landfills. Is it really possible to recycle and compost all the mountains of junk we produce in our consumer lifestyles? We'll find out. First, Net Zero homes. Joining our live audience at the Commonwealth Club in San Francisco, we're pleased to have with us three people from the frontier of cool homes. Ann Edminster is a green home consultant and author of Energy Free: Homes for a Small Planet. Daniel Simons is a principal architect with David Baker Associates, and Sven Thesen, is owner of a Net Zero Home in Palo Alto. Please welcome them to Climate One.

[Applause]

Sven Thesen, let's begin with you. What possessed you to want to pursue a Net Zero energy home?

Sven Thesen: So as a chemical engineer and someone who's done a lot of climate work, I wanted to prove that you could have essentially your cake and eat it too, and that you could have -- well, one of my first -- my wife's requirement was it had to be beautiful. And so it was beautiful. And then I was -- it has to be functional and comfortable and let's see how energy-efficient we can make it. And so our small 5.9 kilowatts system powers the house. It also powers 10,000 miles of electric car carbon-free zero emission driving.

And the house uses roughly 25% of the energy of an average house in Palo Alto. So we have a small solar system and it's extremely comfortable. People don't notice except in the summertime when it's really hot they walk in and say, "Oh, this is really nice and cool, you must have your air-conditioning cranked," and I get to say with this wonderful grin, "I don't have an air-conditioning system. All I have is good building orientation, a heck of a lot of insulation and some shading on the sunny side, that's it."

Greg Dalton: Do you have to be like Jimmy Carter and wear sweaters in the winter?

Sven Thesen: So that was the whole point was to be able to prove that we could have comfortable, affordable, functional, and that you wouldn't have to sacrifice anything. So, no, I wear no shoes, and t-shirt and shorts pretty much all year round inside and it's nice and warm. And we don't, again, we use 25% of the energy of a conventional house and it's all generated in excess by our solar panels, and it's not a huge solar system.

Greg Dalton: Ann Edminster, you wrote the book on Net Zero homes. Tell us about your home and do you have an 80-inch TV?

[Laughter]

Ann Edminster: No, actually we have a rather petite TV and can't quite even figure out how to use it these days. My teenage son won't give us the answer, so we've given up. We now watch on the iPad.

[Laughter]

Greg Dalton: Yeah.

Ann Edminster: So that's one of the measures that we take to reduce energy in our home.

Greg Dalton: iPad versus a TV. Okay.

Greg Dalton: Any other exotic features?

Ann Edminster: Exotic. We have a living roof, we do have a solar array, it's quite petite, 2.4 kilowatts. We are not at Net Zero yet, we're doing that sort of incrementally. So we have a few stages left to go. Most recent, Andy Wall, who you'll hear from later, actually helped get our attic ready for the installation of some New Zealand sheep's wool insulation. So that's a pretty fun thing. Both my kids want to climb in there and nap.

Greg Dalton: Right.

[Laughter]

Is that expensive, sheep's wool from New Zealand?

Ann Edminster: It is. There is a premium, but I was shielded from that fact by being an advisor to the company.

[Laughter]

Greg Dalton: Inside deal. Okay. Alright. So, alright. So the rest of us have to settle for Levi's or something else. Okay.

Ann Edminster: Well, it's all a matter of priorities.

Greg Dalton: Right. Daniel Simons, tell us about your home.

Daniel Simons: Well, I actually don't live in a Net Zero home but we've designed a couple of them. And the one that we designed here in San Francisco is really quite small. I think that's one way, I mean, not that everybody has to live in a small home, but it's much easier to make a small home Net Zero. So it's a 700 square foot house. And then it also has a wood shop in it. We power the wood shop from a pretty small PV system. I think the key with getting to Net Zero or just being efficient is trying to figure out how to reduce the loads, like Sven was saying. Like the goal is really to make the buildings use as little energy as possible. I mean, any reduction that you can make just, you know, switching from an incandescent bulb to an LED bulb or insulating your house or upgrading the windows. All of these things, you know, incrementally reduce the energy consumption of the entire built environment. And when you get down really, really low, then it's easy to put a small PV system on the roof and power the whole thing.

Greg Dalton: Ann Edminster, we replaced the windows on our home and my head started to ache with all the R-factor, those factors that measure the light that comes through and the energy that doesn't come through, and it was mind-boggling. And I was very motivated, geeky, said I got to do

this, right, I've got to walk the walk. But it was very complex. How many people really want to bother with the complexity, and that's just one piece of a house, right? Changing the windows is no simple thing.

Ann Edminster: It's true. I think, right now, one of the unique opportunities we have is it's still very much an innovator's world, Zero Net energy. And therefore the people who are willing to play are also willing to sort of absorb a certain amount of that geekiness. And they are in effect paving the path for the others in the future to sort of demonstrate what works, what's a good investment, what was maybe an interesting idea but not necessarily widely applicable. So we're in that process right now. All of us who are pioneering this field are still kind of winnowing those ideas and identifying the ones that are sort of winners across the board.

Greg Dalton: So what are some of the winners?

Ann Edminster: Well, sheep's wool insulation.

[Laughter]

Really good insulation.

Greg Dalton: If you know the right people.

Daniel Simons: Thank you.

[Laughter]

Ann Edminster: Yeah. No, as Sven said, lots of well-installed -- I think this is one of the things that is sort of unfortunate is, some of the most effective things we can do are the least sexy. So really good job of air sealing, really good job of insulation installation, and that's just not glamorous. But it has tremendous paybacks in comfort, energy reduction and so forth. Also, reducing potential durability issues related to condensation of moisture. So there are a lot of good reasons to do it.

Greg Dalton: Caulking doesn't get a lot of respect.

Ann Edminster: So true!

Greg Dalton: We put solar panels on first because I think they're cooler and sexier. And then did the sealing of the garage, et cetera. That's actually backwards, right? Daniel Simons?

Daniel Simons: Yeah. I mean I think so. And I think it's definitely -- I think that the -- you know, you have to be a little bit more careful when you start really super insulating the building envelope because there are, you know, moisture management things that you have to take into account. And there are, you know, when you really seal a building for air, you have to make sure that there's fresh air. But none of the technologies to do that are that cutting edge. I mean, it's stuff that people have been doing for years, it's just different from the conventional way that buildings are built in this country now. And so it is, it's just sort of shifting the paradigm slightly. And thinking about what's valuable in a new home as being that it has to have, you know, continuous exterior rigid insulation. And it has to have an HRV. And it has to have these things which, you know, are really jargony and probably don't -- you don't really need to know them as consumers, you more just need to know that it's possible and push the people who are building your house to look for them.

Greg Dalton: Let's get some tips. We have Andy Wall here with us at Climate One. We're talking about Net Zero and super performance homes. Andy Wahl is an energy consultant. He's going to

give us some tips for people who maybe want to strive towards Zero but not get there in one swoop. Andy, welcome.

Andy Wahl: Thank you. Thank you very much for speaking here at Climate One. My wife and I, we live in a retrofitted -- actually it's a Net Positive house. It actually produces more energy than what we consume, plus we drive some of our automobile on it. We've been in it about three years now. It's about a 28-year-old house. We have less sickness than what we did, less cold and flus, less allergy problems.

My wife says there's at least 75% less dusting that goes on because we don't open the house up at all, it's ventilated, it's two stories, it has two to three degrees difference from any room to any room. It doesn't matter whether we heat, cool or not. So great comfort in it. And I do training for PG&E, consulting for a variety of organizations. Some of the things we should look at is we should have a goal, a real important goal that we want and we stick to it. We need to have a budget, it might be bigger than you would like, but we need the budget for this project. Real important is our architects, our designers, our contractors. They need to be held accountable for what they're putting into our houses, which is not what's happening today. We need to keep ourselves accountable for what we plug into things and what we've chosen to do. And we need to hire the real professionals to do this. And sorry to tell you there might only be about 100 or so in the State of California that can do true net energy houses that are comfortable. And joining those that have done the proper Net Zero can do an amazing improvement to the quality of your life. Thank you.

Greg Dalton: Thanks Andy Wahl. Ann Edminster, let's talk about where someone should go. I want to improve energy efficiency in my home, where do I go? Where do I start?

Ann Edminster: Is this a softball for me to pitch my book?

[Laughter]

Greg Dalton: You can pitch it, but other than your book -- yes.

Ann Edminster: Well, you know, as Andy said, I think there really is a relatively small cadre of folks who do have the expertise.

Greg Dalton: How do you know?

Ann Edminster: So where do you know? I'm a board member of the Net Zero Energy Coalition and I think that's an excellent place to start. We are online at netzeroenergycoalition.com. And you can peruse our membership directory, that's a great place. We have folks all across North America, actually. And for people local to California, you're welcome to e-mail me and I can tell you all about everybody I know who's involved in this world.

Greg Dalton: Daniel Simons, every architect these days claims to be green. How do you know who's really green and whose green-washing?

Daniel Simons: You know, it is really hard to tell. I mean, I'll be honest, I think that there isn't an architect out there who doesn't say that they know something about sustainability. They probably do know something about sustainability. I think it's like anything else that you're buying; you have to do some research. You have to talk to the people who've worked with the architect, you have to, you know, ideally go and see something that they've designed or built. And yeah, I mean, it's, you know, it's not easy yet. I think at some point in the not too distant future, a lot of the things that we're talking about are going to be code minimums and everybody's going to be doing them and it's not going to be -- you won't have to do any research. You'll just go and hire a contractor and they're

going to build you a Net Zero Home because that's the only way we build things. But when you're on the cutting edge, it does take a little bit more of your own energy and willpower and thoughtfulness.

Greg Dalton: Sven Theson, let's talk about cost. This is perceived to be an elite thing for people who've got extra money, deep pockets. How much did you spend on your house?

Sven Thesen: We spent -- the rough estimate is less than 5% above and beyond what we would have paid for the house. So it's not a huge amount. The way I look at it was an investment in green jobs because they spend a lot more time on the framing, and they spend a lot more time putting in insulation. We spend a lot more time doing air checks, the sort of pressurized test to make sure the building was extremely well sealed, all that caulking paid off. And I think people, you know -- how much does a car cost? Well, you can buy a new car for 18,000 or half a million.

What sort of car do you want? And so we wanted a home, it's only 2200 square feet; there are four of us living in it. We wanted a reasonable home that was extremely comfortable, extremely functional and still had an extremely small carbon footprint. And then the joy is we won, we did most of the things right, it is really comfortable

Greg Dalton: Daniel Simons, is this -- are these homes an elite thing only?

Daniel Simons: I mean, you know, to a certain extent, yes. I mean, how many people actually, you know, hire an architect and design and build their own home. You know, it's not -- that's a pretty small percentage of the population. I mean, most people, I don't know, they rent a place or they buy one that already exists. So to a certain extent it is a leap, I mean -- and I think that as we move into a more sustainable future, you know, single-family homes are a thing that probably aren't the most sustainable model for living. I mean, we probably should be building higher density. We probably should be living more in cities. And there is a point at which buildings get tall enough that it's actually really, I mean, I would say impossible for them to be Net Zero, you know. I mean up to a six-story building may be, but, you know, when you start getting high rises, there's just not enough roof area to power with PVs. But like I was saying before, that doesn't mean that making those buildings super energy efficient isn't still a really good goal.

And hopefully, you know, as we move forward into this more sustainable future, more people will have the option of not going to some great effort to hiring an architect but rather just picking the Net Zero home as the one that they buy or rent. And when that happens, I think it will be more accessible to everyone.

Greg Dalton: Daniel Simons is a principal at David Baker Architect in San Francisco. We're talking about Net Zero homes at Climate One. Ann Edminster, one of the critiques of Net Zero homes is that they are the suburban single-family home. But you say that there's actually some urban examples and it's not just this sort of suburban home with lots of roof area for solar, et cetera. Tell us about the urban application.

Ann Edminster: Absolutely. Yeah. In fact, one of our real rock stars in the Net Zero Energy Coalition is a man named Shawn Armstrong who is developing multi-family, affordable housing that is reaching Net Zero Energy up in Arcata. So these are unit buildings with 2,650 units. And Shawn has been finishing these projects and reaching these goals for about the last three years. And one of our earliest projects here in the Bay area was a zero lot line, very small townhome over in Oakland.

Greg Dalton: Zero lot line means what?

Ann Edminster: Means wall-to-wall houses built right up next to each other. So it's not the sort of suburban castle and the moat model, much more dense even though it's a single-family home, really different model.

Greg Dalton: And on the cost issue, Sven Thesen said 5%, is that what people think about, you know, in terms of the cost premium for Net Zero or is it --

Ann Edminster: I only wish that's what they thought about. There really is, I think a very widespread thought that there is a dramatic premium for Zero Net energy. My belief and my experience is that there is no cost premium. Because any commissioned project, you're given a charge and a budget and you'll either meet that charge within the budget or you don't. And if you don't, you're generally off the job. So all of the projects that I've worked on, Zero Net Energy hasn't been achieved accidentally, it's been part of the initial design charge. So we meet it within budget. It doesn't cost extra any more than the kitchen sink would cost extra if you were being asked to remodel a kitchen.

Greg Dalton: Right. But as Daniel said earlier, very few Americans these days start from scratch, they probably buy a house or remodel a house. How about the upgrade path? Getting to zero with an existing building, they're doing it incrementally, is that slow and painful and costly?

Ann Edminster: It's slow and costly. Personally, I think it's really fun.

[Laughter]

I wouldn't call it painful at all. But, yeah, there has to be a certain commitment. You know, we're dealing it for philosophical reasons. On the other hand, I'm a great believer in what I call opportunist or remodeling, which is if you're thinking about remodeling for whatever reason, there always ancillary opportunities that you may not be aware of that you can take advantage of if you are already planning to do x, then you can do y at the same time. But the only way you're going to know that -- this goes back to Andy's comment about who are those trained professionals -- and as Daniel said, caveat emptor. So, yeah, it really does require working with a skilled team to identify those opportunities.

Greg Dalton: Let's go to our lightning round. We have a couple of quick questions for each of you starting with Ann Edminster. Energy efficient homes have stable internal temperatures, eliminating the need for toys such as nest thermostats that tinker with home heating and cooling.

Ann Edminster: Yes.

Greg Dalton: Okay. Sven Theson, hydrogen cars have a bright future.

Sven Thesen: No.

[Laughter]

Am I allowed to say more?

Greg Dalton: No, that's it --

Sven Thesen: I'm sorry, the chemical engineer in me says, just no economic, environmental, the whole -- it's just stupid. Ask me later.

Greg Dalton: Tell that to Arnold Schwarzenegger. Okay. Sven Thesen, Net Zero homes are show

pieces for rich people.

Sven Thesen: No, on both accounts. I would love for you guys just to come and visit. It's only 2,200 square feet, look out for the -- we got two rats living in the house, pets. And four chickens, two kids, don't mind the mess. I don't think so. We had a choice. We could have something that was a little bit fancier and a little bit bigger. But we chose to be a lot more comfortable.

Greg Dalton: When we did the sound check, he listed the chickens ahead of his children, then he switched it, so.

[Laughter]

Daniel Simons, the Well Building Standard is designed for wealthy hypochondriacs.

Daniel Simons: Yes.

[Laughter]

Greg Dalton: Daniel Simons, the building industry does a terrible job managing waste from construction sites.

Daniel Simons: No.

Greg Dalton: Got some yeses in the audience but no up here on stage. Last one for Daniel. Gardens and other green features are too expensive to build into low-income housing.

Daniel Simons: No.

Greg Dalton: Okay. We're talking about Net Zero homes here at Climate One. And we've got a few more questions before we go to our audience questions. Ann Edminster, what are some of your pet peeves for the general way that American homes are designed?

Ann Edminster: Oh, boy. It's a long list.

Greg Dalton: Top three.

Ann Edminster: Top three. Really elaborate roof designs. Sort of egregious applique features that are intended to beautify but actually just kind of -- well, I'm looking for a polite term. They cause problems in terms of durability, thermal performance, comfort and so forth, and add a lot of cost that could be invested in those aspects of performance instead. That's a big pet peeve.

Greg Dalton: And also the placement of electrical plugs?

Ann Edminster: Oh, yes, that's kind of on the more trivial, eccentric side.

Greg Dalton: Why are they where they are?

Ann Edminster: Why are they 12 inches from the floor? So you have to crawl under the furniture with the spiders and the dust bunnies if you want to actually control some of your electrical devices, that's just silly.

Greg Dalton: No one's got an answer. How about dashboards? Some of these sophisticated buildings have dashboards. Does an energy dashboard really improve the performance of the humans living in it?

Ann Edminster: Really interesting question. So there've been a lot of studies that look at that. And the meta-studies that sort of look at all of the studies are very inconclusive, they say, "Meh," you know. Maybe it actually increases energy use minus 2% up to 20% improvement. My theory is though -- because as I mentioned earlier we're in this innovator early edging into early adopter stage -- that we have an opportunity with Zero Net energy homes now that our audience for those products are like Prius drivers and are going to be interested. So I really believe that a dashboard should be in every Zero Net energy home, especially right now. Because you mentioned that we're at the forefront of cool homes, I really like you for saying that. It will be cool. We are the cool people and we will make it cool. So other people will want to be cool, too.

[Laughter]

Greg Dalton: Do these people look cool? I mean, they look cool to me. Sven Thesen, dashboard in your house?

Sven Thesen: No.

Greg Dalton: You don't need one?

Sven Thesen: It just fell apart. I don't need one. Or it's not --

Greg Dalton: Not necessary?

Sven Thesen: What are we going to do, change out another LED light for another LED, better LED light? Right now, no. I would rather have my daughter better potty train to poop at the back of the toilet as opposed to the front; we've got these dual flush toilets.

[Laughter]

Ann Edminster: TMI, dude!

Sven Thesen: Yeah. That's it.

Greg Dalton: Yeah. I don't know where to go with that one. [Laughter]. Daniel Simons, I'll ask about water, are Net Zero water home -- Net Zero water buildings, is that achievable, is that real?

Daniel Simons: It's totally achievable. I think there are many more hurdles to Net Zero water than there are to Net Zero energy. There's a lot of, you know, public health issues associated with black water recycling. And I mean there's -- it's just -- it's a much -- you have to be really -- if you want a Net Zero water house, you have to be really dedicated. But they're out there. And again, I think that achieving Net Zero is, I don't know, it's not irrelevant, it's not as important as it is to really think about having super water efficient homes.

Greg Dalton: We're talking about Net Zero buildings at Climate One. Daniel Simons is the principal at David Baker Architects, other guests is Ann Edminster, author of Energy Free: Homes for Small Planet, and Sven Thesen, owner of a Net Zero home in Palo Alto. I'm Greg Dalton.

So let's go to audience questions. Welcome to Climate One.

Male Participant: Thank you very much. I'd like to also express the opportunity for low-income multiple families' complexes to be able to achieve Net Zero. I have the great privilege of working with the Third Baptist Garden Inc. Group that owns the Frederick Douglas Haynes Apartments here in San Francisco, 105 Units, built in 1970, they were built to 1970 standards, they're falling apart

now. But our group is taking the Net Zero approach. We're putting 285 kilowatts on the roof, 3,500 square feet of thermal. We're doing gradient panels for heating, HRVs. Our dashboards are going to become critical because we're taking all of the meters out. But the challenge really becomes the one of our interface with the utilities around us. PG&E, are they going to help? The utilities in terms of water, are they going to help? How do we work with the utilities to create the climate where we're able to achieve these kinds of opportunities? Thank you.

Greg Dalton: The utilities, who would like to tackle that, Ann Edminster?

Ann Edminster: Sure. You asked earlier about slow, costly, and painful. [Laughter]

To be fair the utilities are really stepping up, I think, but the challenge is often finding the right voice. So the utilities, I would say, one of my larger critiques is that they tend to be very siloed. And so it's oftentimes identifying the right person in the utilities who can provide some assistance and that just requires navigating the maze. So I think it's -- the lesson is, be persistent.

Greg Dalton: Not very customer-friendly organizations. Let's have our next question at Climate One

Male Participant: Thanks. I'm expanding the definition of home from a single-family home to like home of kids, meaning schools, kindergarten's, home of sick people, hospitals, home of inmates, prisons and home of the worker bees like in the office buildings. So I'm just curious like if you have any examples of like Net Zero in that like arena, sort of like the larger buildings?

Greg Dalton: Institutional owners have a big incentive to save energy on things. Daniel Simons?

Daniel Simons: There's a great -- the West Berkeley Library is Net Zero energy, if anybody wants to go. It just opened up, it's a really great building and they have a dashboard. But it's a really nice library as well. There's also a manufacturer of modular classrooms that just came out with a Net Zero energy module. So that when you're doing the modulars on your local elementary school, they don't have to be those horrible little white boxes that they usually buy, they can be really nice and have no energy use. So yeah, I think there is-- there are tons of examples out there.

Greg Dalton: Interesting. Let's have our next question at Climate One.

Male Participant: Thank you. So many people in San Francisco rent including myself, and my three housemates and I pay our utility bill. And in this situation, our landlord has no incentive to retrofit our building which is an old Victorian building.

So my question is, have you thought about this dilemma of decoupling, and is there any way to address it?

Greg Dalton: Ann Edminster, it comes up with solar as well, but a very important part of the population here in the city and around the Bay area.

Ann Edminster: Really challenging question. I think that there are certain things that the occupant does control, all of the stuff we call plug loads. So you may or may not have the opportunity to decide about what appliances you're going to use. When we do a better job with building enclosures, we find that increasingly the loads are dominated by things like electronics. When you don't have the opportunity to have an impact on the enclosure, it's a little bit tough. But there's an interesting phenomenon. Lawrence Berkeley Lab did a study a couple of years ago where they looked at 10 so-called deep energy retrofits. So this essentially is what Daniel was talking about earlier without the solar necessarily but we're really working on getting the loads down. And

one of the interesting conclusions that they arrived at was that there are two primary prongs to the strategy for achieving Zero Net energy, one being behavioral and the other being technological. And so depending on which case study they were looking at, the solutions were dominated by either the technological or the behavioral approaches. So I'd say as a renter, you're kind of left with the behavioral as your primary strategy, unfortunately. But there are no Zero Net energy buildings without Zero Net energy occupants.

Greg Dalton: Last question, welcome to Climate One.

Female Participant: Hello. Thank you. I have the opposite of the landlord-tenant problem. I have a great landlord and she would like to do these things, but I receive all the benefits. And she's been gradually, painfully retrofitting. Are there any arrangements happening or can you perceive -- can you imagine ways that the incentives could shift so that landlords really do have an advantage to doing this where the tenant receives so much of the benefit?

Greg Dalton: If a landlord improves the building envelope and they're paying utility bills, don't they benefit from better windows and ceilings --

Daniel Simons: Yeah, but a lot of times, they don't pay the utility bills.

Greg Dalton: Alright. They don't pay, the tenants pay utility bills. So there's a problem. I don't care 'cause you're paying, you don't care 'cause I'm paying, how do we solve that?

Daniel Simons: It's really. I mean it's a huge issue. We design a lot of multi-family housing and the whole, you know, incentive metering thing that has come up a couple of times, it's really difficult to navigate for a number of reasons, like photovoltaic systems are really difficult -- or not difficult, but it's difficult to work with PG&E to allow you to put one on a roof and to feed, you know, 15 or 20 or 100 units in the building because they like to just go back into one meter, which is usually not for the residents.

So it's a difficult thing. I mean, I think that there are economic models out there that can show where if you're renting and you can prove that you're -- the utility burden for that renter is lower that the rent can be higher. And even with affordable housing, that's the case. So there are ways that it could incent people. But in an existing situation like you described, it would be very difficult to do. I mean, maybe you could figure out some way of splitting the difference with your landlord, you know, where if you could show that you save 20 bucks a month, you give them 10 or something like that.

Greg Dalton: Alright. We have to wrap here on this portion. We've been hearing from Daniel Simons, principal at David Baker Architect, Ann Edminster a Green Home Consultant and author of, Energy Free: Homes for a Small Planet, and Sven Thesen, owner of a Net Zero home in Palo Alto. I'm Greg Dalton. I'd like to thank this group for this first portion of Climate One. Let's thank them right now.

[Applause]

Greg Dalton: We're back now to go dumpster diving. California creates an average of four and a half pounds of waste a day. San Francisco and other cities want their residents to cut that to zero by recycling, composting, and being more mindful about what people consume. More than dirty sidewalks are at stake. Landfills are a big source of methane, potent greenhouse gas that is

amplifying severe weather including the drought in California. We're joined now by three people at the forefront of slimming waste lines. Kevin Drew is the Residential Zero Waste Coordinator of the San Francisco Department of Environment. Lauren Hennessy is Outreach Manager at Stanford -- Sustainable Stanford, and Diana Dehm, is a sustainability consultant and founder of Trash on your Back challenge. Please welcome them to Climate One.

[Applause]

Greg Dalton: So Diana, let's begin with you. You were doing an interview a few years ago and you came up with this idea spontaneously of walking around with trash on your back. What prompted such a moment of insanity?

Diana Dehm: It was a definite moment of insanity which turned into something pretty cool. I was interviewing MIT at that time, I do a radio show as well, and it's all about solutions for the planet. And they were talking about this climate simulator tool. Anyway, one of the guys on the show was so excited, so I had to stop the show I go, "What is your passion? Why are you so excited?" His name is Drew Jones, he's amazing, he's a wonderful guy. He's the executive director for MIT's climate simulation. Anyway, so he came back, he goes, "Back in 1989, I was at Dartmouth College. And bunch of radical buddies and I decided to go out and see what our impact was." So they walked around with their trash for a week.

And I said, "You know, Drew that sounds like an idea that needs to be recycled." And he's like, "You'll do it, Di?" and I'm like, "Yeah, let's do it. What the heck."

So the next day I called about 17 really good friends. One is Matt Bogoshian who is pollution prevention guy for the US EPA. "Hey, Matt, will you carry your trash on your back for five days?" So he said, "Yes." He was the first early adopter. And what ended up happening, we had 17 people in 16 States the first year and that was four years ago. We did it on Earth Day. And every year we have an annual Earth Day thing and this again was four years ago. And we would just talk about the learnings.

So anyway, the first year we did have quite an amazing turn out. The second year, we had about 2500 people from around the world, 27 states and 6 countries. So when you see Israel and Australia, and you see all these little kids getting on board, we're really trying to help everyone understand that we can create a zero waste world and we can do it. You mentioned the 4.4 pounds of trash average per person, well, we were able to knock to that down to 0.8 pounds per day, right, just by doing this.

So it's turned into a very interesting thing and kids are just grabbing onto this like in amazing ways. It's a Math issue if you think about it, you know, weighing things and measuring things, and it's also a Science issue. So STEM is playing a huge role on this. And so, yeah, I'll stop there.

Greg Dalton: Great. We'll get back --

Diana Dehm: I'm so excited about it!

Greg Dalton: We'll keep going. Lauren Hennessy, you created a video that caught our attention sort of a parody of a Meghan Trainor video, "All About That Bass." So tell us how you came up with that video and what you're trying to do to inspire college kids to be more mindful about their waste at Stanford?

Lauren Hennessy: Well, also I'll point out that it's not just college kids. We have a significant population of staff and faculty on campus. So it really needs to pertain to a wide audience. So I

really sought to kind of come up with something that would just catch and I really have to say --

Greg Dalton: But do professors know who Meghan Trainor is?

Lauren Hennessy: You would -- I'm not kidding. People are singing this song. But I have to be honest. It really started when a friend sent me a YouTube link of a bunch of frat boys lip-syncing to a Taylor Swift song. And this video had half a million hits on YouTube. And I was just sitting there thinking how -- they are not even doing anything, they're just mouthing the words to the song, there must be a way to get people talking about environmental and sustainable actions in the same kind of fashion.

So it kind of struck me that music is this grand communicator that a lot of people don't really take advantage of. And I think it's been a crucial point that's missing in environmental communication.

Greg Dalton: So let's queue up a little video. This is a riff at Stanford.

[Video Playing]

Thanks. So a video riffing on a pop tune, what impact did that have, Lauren Hennessy, at Stanford?

Lauren Hennessy: It -- well, I'm here today, aren't I?

[Laughter]

Greg Dalton: Yeah, right. We found you on the internet because of this video. Yes.

Lauren Hennessy: So I'm -- the video today on YouTube had close to 5000 hits which is 100 times greater than any of the other videos that were entered into the competition. We far exceeded our waste minimization in the competition than in years past. And it was -- we doubled our participation in the competition than last year. So it really went far insofar as spreading awareness.

Greg Dalton: Make it fun. Kevin, let's talk about the City of San Francisco which has a zero waste goal. Where in San Francisco is zero waste really possible?

Kevin Drew: Well, that's a very interesting question, very difficult goal that we've set for ourselves, it's very aspirational when we set it. Some of us who were in the business at the time said that's a little bit aggressive, but you can't get halfway there; you gotta just go for zero. And if we get to 99, that's doing really well. But what your guest just talked about was exactly the kind of spreading that's got to happen. It's going to happen to people getting charged up about it and carrying their trash on their back, it's going to happen to college kids and the kids -- the other folks on the campus to find a way to get to zero waste.

It's going to take a million little ways to get there. It's like the same -- it's like the organism that we are and the organism of the planet is. It takes lots of little pieces to really get everything done. You can see the big garbage truck driving by but the bacteria in your gut is doing just as much to keep your system going as that garbage truck and everything in between. So zero waste is really a beautiful kind of a biological construct that we still have to invent. We don't know what it is yet. Everybody's asking us, you know, how are you going to get there, do you have a precise plan? No, we're making up as we go along, frankly. And for God's sake, let's get out there and do it. I mean, that's what we've just seen here.

Greg Dalton: Specific question. I remember being in Starbucks a couple of years ago and seeing on a printed -- on a napkin, "We care about the environment, waste, et cetera." And then I looked

for a place to recycle that napkin in Starbucks and I couldn't find one. So does the City of San Francisco require businesses to have receptacles for compost and recycling and that they're actually in a place that a human can see?

Kevin Drew: Yes, we do. We require that. I would say, is it perfectly implemented, no. But it's -- we're getting there. And actually Starbucks is one that we've worked a lot with, I think we need to get further with them because they are -- they have a lot of control, they have a lot of social ethic in a lot of their business so that they could be a tremendous leader. If they would make their lids and their stirrers compostable along with their cups and take some of the plastic out of the lining in their cup, pretty much everything in the store would be compostable.

Greg Dalton: Tell us where the stream of compost in San Francisco, someone puts something in a compost bin at home or at the office, where does it go? Tell us briefly the life of a compost.

Kevin Drew: It gets consolidated into bins in your house or your business and it gets picked up by our ecology truck and taken down to the transfer station down by Candlestick Park, where it's consolidated it into a big 20-ton transfer trailer which goes about -- there are now 700 tons of organic material being collected every day in San Francisco. And most of this is transported either to Jepson Prairie Organics out near Dixon or to Grover Compost Facility out near Merced where it's turned into compost. Of those 700 tons they end up with about 350 tons of finished compost. There's a tremendous water reduction because most of our food, most of our compost, most of our organics is water. So that's a short story of where it goes right now.

Greg Dalton: And then, what happens to it after that? So does it come back as fertilizer?

Kevin Drew: Not so much because we don't need so much compost here in San Francisco. It's primarily sold to vineyards, golf courses, organic farms. They like this compost, it's a very rich compost because it has a lot of meat and bones and other things. Most composts tend to be agricultural in nature, like from leftover crops or leftover agricultural products. And you don't have -- they're sort of one dimensional. So this, we call it four-course compost because it has a little bit of every course in the meal in it. And it is a very rich product because of that.

Greg Dalton: Does San Francisco get paid for its compost?

Kevin Drew: No. We don't get paid. It's part of -- I'm with the Department of the Environment and we set -- we work with the Department of Public Works to set the rates for the garbage in San Francisco.

And the value of the compost is included along with the value of the aluminum, the value of everything else. It all just pushes together to make one big pot and then we divide it out and come up with your individual bill.

Greg Dalton: Kickback from the trash company. I got it. Lauren Hennessy, composting at Stanford?

Lauren Hennessy: Composting in Stanford is it goes to a Newby Island Facility, so that's actually across the bay. And this is an industrial facility. We actually have a pretty high ability to accept composting, but it is a voluntary composting program right now. So the buildings on campus actually have to elect, to participate at a building wide level. So unless you have that champion who's willing to do it or there is an opportunity with the RecycleMania campaign, we actually give an individual the opportunity to become a compost captain for their floor. So it is on a voluntary basis right now, it's not a mandatory composting program.

Greg Dalton: The RecycleMania campaign ended this week. And Stanford came in at 78. I didn't see CAL on the list. I might have missed it. I'm just saying. San Francisco State, number 13. So how do you feel about that?

Lauren Hennessy: I got to tell you the big one for me that really hurt was that Harvard beat us in the guerilla competition because we actually talked some trash --

Greg Dalton: About Harvard.

Lauren Hennessy: In the video.

Greg Dalton: Yeah. It's right. So --

Lauren Hennessy: So that one was the one that was really hurtful but I have to say that we actually increased our standings in every single category from the previous year. So although we weren't necessarily number one, we have increased.

Greg Dalton: Diana Dehm, you're from Orange County. How much composting is happening in Orange County?

Diana Dehm: Still getting -- it's not there yet.

Greg Dalton: Yeah. Kevin Drew, why not -- why don't -- is it cost?

Kevin Drew: It is a certain amount of -- it's just really political will. I mean, when you think about garbage, you know, trash, the trucks are there, they drive around, they pick it up. I'd like to tell people, it's just about driving it to a different location in the same truck. It weighs about the same. And there are some programs in Orange County that friends of ours have started, Stephanie Barger in Zero West Group down there and they focused on restaurants and grocery stores first because that's what we did. It's just where the concentration is. You don't have to drive around and pick up a thimbleful. You can pick up a lot in a restaurant, in a produce store and then you can kind of expand from there. So there's many good examples like that, and it's happening. There's more happening than you know because the industrial people don't want to pay to throw it in the landfill, that's very expensive. You can pay less and go to a compost facility and you avoid all those methane.

Greg Dalton: So when I'm at SFO and I see the bin that says, "Recycled off-site," I go, "Yeah, right. Really?"

Kevin Drew: A very good story there. Actually, South San Francisco Scavenger just built the second anaerobic digester; it's called the dry anaerobic digester. It's kind of like a barn and they take that material, they get, they sort out the contaminants that people do, and take the organics and put it in a lump. They don't compost it; they put it into like a barn, close the doors and let it sit there for 21 days. They sprinkle a little bit of a kind of an enzyme that helps stimulate it. But you get basically rotting going on in that pile. And they pull off the methane after 21 days, they pull it out and then they compost what's left. It's a very interesting technique, different than the wet anaerobic digestion that people maybe are familiar with at sewage treatment plants.

Greg Dalton: Anaerobic being without oxygen?

Kevin Drew: Right. Right.

Greg Dalton: Kevin Drew is the Residential Zero Waste Coordinator in San Francisco. Our other guests today at Climate One are Lauren Hennessy, Outreach Manager, Sustainable Stanford, and

Diana Dehm, Radio Host and founder of Trash on Your Back. We'll be right back after this break.

[Climate One Minute]

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

Many companies have started using disposable products made from plant-based plastics. Will that help reduce the trash on our collective backs? Adam Lowry, co-founder of Method Products, was our guest in 2014. He warned that even biodegradable plastics aren't as earth-friendly as we'd like to think:

Adam Lowry: *Bioplastics as a whole can give people, consumers, a false sense of responsibility, and I think that's very important. This plastic that I'm holding in my hand which is an ordinary drink cup made out of a bioplastic, PLA in this case. When people use these things at a concert or a place like this and then throw it in the trash, people think that this thing is going to biodegrade. And it doesn't. It's going to be there decades or centuries later just like the red Solo cup. Because, as was said, it needs an industrial compost. It needs heat and moisture in order to break down.*

And so I think that's really dangerous because there are millions of these things around right now. And people think "Oh, it's biodegradable. I'm just going to chuck it." And it perpetuates the single use behavior of using plastics and chucking them away when really what we've got to do is we've got -- if we're going to use something like this, we've got to pair it with the ability to get all of it back.

Announcer: *Adam Lowry of Method Products, speaking with Climate One in 2014. This has been a Climate One Minute – now let's go back to talking trash with Greg Dalton and his guests at The Commonwealth Club.*

[End Climate One Minute]

Greg Dalton: We're going to go to our lightning round. Diana Dehm, you are a closet-- this is yes or no. You are a closet hippie.

Diana Dehm: Yes.

[Laughter]

Greg Dalton: You have gone dumpster diving.

Diana Dehm: I have.

Greg Dalton: Okay. Lauren Hennessy, pizza leftover from frat parties makes good compost.

Lauren Hennessy: Yes.

[Laughter]

Greg Dalton: Stanford students prefer weed grown with solar power.

[Laughter]

Lauren Hennessy: Yes.

Greg Dalton: Okay.

[Laughter]

Kevin Drew, as mayor of San Francisco, Gavin Newsom, started the city's pioneering composting program. As lieutenant governor, he has a lot of time on his hands and could make a good compost cop.

Kevin Drew: Yes.

[Laughter]

Greg Dalton: A compostable cup or fork thrown into a landfill will biodegrade back into the soil. Yes or no.

Kevin Drew: No.

Greg Dalton: Okay. We got a list here. It's okay to put the following items in the compost bin in San Francisco. Meat.

Kevin Drew: Yes.

Greg Dalton: Bones.

Kevin Drew: Yup.

Greg Dalton: Clam shells.

Kevin Drew: Yes. Clam shell, you mean, from clams or are you talking about --

Greg Dalton: Real clam. About the -- yeah, yeah.

Kevin Drew: Clam shells. Yes.

Greg Dalton: Pistachio shells.

Kevin Drew: Yes.

Greg Dalton: Paper salad containers.

Kevin Drew: Yup.

Greg Dalton: Dog poo.

Kevin Drew: No.

Greg Dalton: Okay. Alright. That ends our lightning round.

Lauren Hennessy: Can we talk about the difference between biodegradable and compostable?

Greg Dalton: Good point. Yeah. It's --

Lauren Hennessy: Cause this is very frustrating for me and I must say I've been trying to purchase compostable balloons for an event that we're having. And the amount of people who will say that they have something that is compostable and then when you say compostable or biodegradable, and they're not quite sure, is astounding. But that's an important distinction.

Greg Dalton: Confusing labels. Biodegradable like, I mean in 1000 years, sure --

Kevin Drew: Biodegradable doesn't mean anything. Compostable is a very strict standard within the STM certification. And we've had to get legislation passed in California to require that word compostable mean what it means and that biodegradable doesn't mean anything.

Lauren Hennessy: And you see biodegradable on so many things now. So, yeah.

Greg Dalton: I'd like to ask Lauren Hennessy and then Kevin Drew. What impact does commodity prices have on the economics of recycling? First, Lauren Hennessy.

Lauren Hennessy: Pretty significant. So we -- different from San Francisco, we actually do get paid for the tonnage that we send to recycling and composting. So commodity prices, if we're able to -- our paper for instance is pretty pristine at the university setting. So we get a very high rate for our paper. We say we pay twice if we throw something in the landfill because not only are you paying to landfill it, but that you are also losing the cost that you would receive back in payment for your goods.

Greg Dalton: So there's cash in the waste.

Kevin Drew: Oh, yeah. Absolutely.

Lauren Hennessy: Mm-hmm. A lot.

Kevin Drew: And commodity prices make a huge difference. And they always -- they will just continue to be that way. It's just not -- anything you can do about it. I think what we really need to see is certain things like organics and other products become commodities. I think that's what's happening with organics. It was perceived as trash.

Greg Dalton: And when you say organics here you're talking about food and other things not organic, milk like we got at the grocery store, right?

Kevin Drew: Right. Organic really means anything with -- you know, what does it mean? Like I mean, you know, petroleum is organic when you get right down to it. But what we usually mean is something that was alive recently.

[Laughter]

Because the last time --

Greg Dalton: I can see some oil companies, they're going to use that clip.

[Laughter]

Diana Dehm: Yeah. That's it.

Greg Dalton: Oil companies are going to -- you're going to be in some oil company ads here. Diana Dehm, a lot of kids, certain generations, learned recycling from their parents. Maybe the current kids are learning composting the way you and I learned recycling. But tell us how kids are getting involved in your campaign?

Diana Dehm: You know, it's interesting when you -- one of the things I love to say is love them, educate them and get the heck out of the way. Kids get it. What I'm always amazed at is K through

12 students, they are fearful. They know that there's an issue, right? And it's thanks to our teachers, it's thanks to our parents, it's thanks to the messaging that we're getting out there. I think media is so important to get this message out there. We've had some kids come back with some amazing statements on what they've learned in just collecting their trash to understand what their own personal impact is. Then what happens which is really interesting, they go to their parents and they say, "You know what, Mommy, Daddy, we're only going to buy compostable, biodegradable or recycled products." That's the power of the pocket book that these kids are getting. It's pretty interesting.

Greg Dalton: Let's talk about another institution that's getting it. You say that the Super Bowl was really zero waste. Talk about professional sports briefly. You mentioned the Mariners earlier. One of your friends is doing a super green stadium for the Atlanta Falcons.

Diana Dehm: Yes.

Greg Dalton: So let's talk about the professional sports which really has a big influence on pop culture.

Diana Dehm: Huge. And that's like the music and the sports and the, you know, doing something crazy like carrying your trash on your back.

But one of the things about when we first started, Scott Jenkins, he was the operations director for -- or VP or something for the Seattle Mariners. And if you think about a stadium, it's a city in itself, right? City in itself. So he was able to start down the path, he also co-founded the Green Sports Alliance. He's on my board which I'm so thankful to have him because he sees the fan engagement opportunity here through sports. But the Seattle Mariners became zero waste three years ago. No, I'm sorry, 98% zero waste. So they go back in their supply chain, they look at what they're buying and then they'll take that. And when you go on to the stadium whether it's a hotdog, it's going to be compostable, whether it's a container. The supply chain now says, "Everything, nothing goes to Landfill. So major league sports is getting majorly involved, and they're getting very competitive. Scott left and went to the Atlanta Falcons. And he's designing and building getting back to what we talked --- what you guys talked about earlier was how do we make a Net Zero stadium and how do we make it 100% zero waste? So there's a lot happening and when you go in there as a fan, you experience that feeling, plus they're making money at it, right?

This whole Trash on Your Back piece, you know, 4.4 pounds of trash per day, right? We knocked that down to 0.8 pounds per day. Just take 50%, that's an 82% reduction. The U.S. spends $12 billion -- expected $12 billion a year in waste management, right? We take 50% in one week. We're able to knock that down. And it's a $6 billion -- you know, 50%, $6 billion opportunity for the nation. Wouldn't we rather put that in schools, in compost facilities and, you know?

Greg Dalton: Yeah. We're talking about Net Zero waste at Climate One. Our guests are Kevin Drew Residential Zero Waste Coordinator with San Francisco Department of Environment; Lauren Hennessy, Outreach Manager with Sustainable Stanford and Diana Dehm, founder of Trash on Your Back and a radio host.

Greg Dalton: Let's go audience questions. Welcome to Climate One.

Male Participant: Hi. One quick question. You had mentioned early on, the idea of getting to zero waste. I mean, I know that during World War II, the country got to essentially zero waste because it was needed for the war effort. Does anybody have any thoughts on what the inclusion of plastics into our consumer system how that affects the possibility of that even happening again?

Greg Dalton: So Kevin Drew, there's all these plastics, all these numbers on them, that people my age can't see. We don't know what they mean. And we don't know if compostable is really compostable. It's very different than the 1940s. We didn't have McDonald's and a lot of things then.

Kevin Drew: Right. No, I mean, actually I was born in 1952 and I kind of -- I feel like all the plastics that's ever -- plastics only existed in my lifetime and all the plastic that has been made in my lifetime is still here. It' either in the ocean, on the ground or it's been incinerated in the air in particle form. It's a real -- it is a tremendous challenge. On the other hand, it is recyclable. I mean, it is a product that could be, once separated, can be dealt with. I think we got to stop using it for 30-seconds, you know, the plastic bag and throwing it away or five minutes in a bottle that would last 5,000 years. So that is one of the big challenges. But I think, I think people are on to plastic, really. California has done tremendous things in the last few years. I think San Francisco has helped lead the way with that, with plastic bag bans and plastic materials in food service being banned. So it's a long way off, but I think it's still, we've got to get there. And you're seeing, again, the kids lead the way.

Greg Dalton: California is in a drought. We're talking about water in pretty much all of our Climate One programs. Diana Dehm, you have this idea, I think you actually did it, of no water for a day. Tell us about that experience.

Diana Dehm: Yeah. I mean, there's -- I have these 10 planetary challenges and so I'm awake at night thinking about different crazy ideas to come out and carry your trash or really bring it home, right? How do we really bring it home? So I did. I just decided one day I'm not going to have any water for a day. No shower, no coffee, you know, I brushed my teeth with just toothpaste, you know. And I wanted to feel what it felt like and it felt horrible.

Diana Dehm: But if you think about it you couldn't even have --

Kevin Drew: Yeah, but at the end of the day, didn't you have a beer --

Diana Dehm: No, I said, until the next day. But, you know what I did, I started, you know, grapefruits, that was my way that I could get liquid in my body. But it makes you really think about, you know, what our liquid is. The other one was that is about to be introduced and I'll let it out here is No-Flush Fridays.

Diana Dehm: The University of -- UC Irvine, my dear friend Bill Cooper, he's the Urban Water Institute director there. He and I got into this incredible conversation on air about what if we just didn't flush the toilet for one day? What would happen? Seriously. And I was like, "Oh, my gosh, we could do that!"

[Laughter]

Diana Dehm: You know, or put a rock or a brick in your toilet. The tank, thank you. Yeah. And see the difference. Yeah. So those are the two challenges that I think that we should do. But the no water for a day, really try that. It's hard.

Greg Dalton: Welcome people to do that. We have time for one last question. Welcome to Climate One.

Female Participant: Thank you. I had a question about regulations, possibly federal regulations. So that things that are more uniform across the country. Because it's one thing to teach kids and families how to separate their garbage and compost in the Bay Area. You go somewhere there's

entirely different standards. I wonder if there's anything being worked on at the federal level.

Greg Dalton: Kevin Drew.

Kevin Drew: Well, actually, at the federal level, I haven't heard specifically that, though I did -- a colleague of ours here, Lisa Gautier from Matter of Trust is actually in Paris pitching the idea of a global uniform color scheme for our trash stream, or our resource stream, because it really is a resource stream. So I mean it's out there. I think it's something that we're just aren't quite there yet in this country but we should bring it up at EPA. I'll tell Jerry.

Greg Dalton: We have to end it there. We've been talking about Zero waste and Zero homes at Climate One. You can hear podcast of this and other programs on the Climate One website, climateone.org. We've been hearing from Diana Dehm, Founder of Trash on Your Back and a Radio Host; Lauren Hennessy, Outreach Manager at Sustainable Stanford; and Kevin Drew who works with the San Francisco Department of Environment. Thank them for coming to Climate One.

[Applause]