Hawaii Gov. Josh Green Says Aloha to Decarbonization

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Ariana Brocious: I'm Ariana Brocious.

Kousha Navidar: I'm Kousha Navidar.

Ariana Brocious: And this is Climate One.

Ariana Brocious: When most people think of Hawaii, they picture turquoise water, palm trees… maybe a mai tai on the beach. You know, paradise.

Kousha Navidar: Yeah, a lot of people think of it like that. But for the people who actually live there, island living is both beautiful AND poses a lot of real, significant challenges. Here's one: Hawaii has been one of the hardest places in the country to get and store energy.

Ariana Brocious: Right. Hawaii can't just pipe in methane gas or plug into a big regional power grid. For decades, it has relied heavily on imported oil to keep the lights on. That makes its electricity the most expensive in the country.

Kousha Navidar: On top of that, Hawaii's facing lots of different impacts from climate disruption. I'm thinking about the 2023 Lahaina wildfire on the island of Maui. It was the deadliest wildfire in the U.S. in more than a century – driven by high temperatures, drought conditions, and really high winds from a category 4 storm. The state has a real interest to be climate resilient.

Ariana Brocious:, Hawaii was the first state to set itself the ambitious goal of reaching 100% renewable energy by 2045. And while most of us on the mainland only think about the state when dreaming of a tropical vacation, Hawaii is so much more: It's a state at the forefront of both climate impacts **and** solutions. So today we're looking to the Aloha State to learn how they are handling

environmental justice, climate resilience, and energy security.

Kousha Navidar: And on that last point, if the state wants affordable, reliable power, it has to generate it locally. Which could mean leaning into what they do have: strong winds and abundant sunshine.

Ariana Brocious: And that starts to look a lot like the challenge facing many regions around the world: places that don't have big oil or gas reserves but do have enormous renewable potential.

Kousha Navidar: For them, wind and solar aren't just climate solutions, they're about the necessity of energy security.

Ariana Brocious: In the last decade, renewables have become a greater share of the state's energy mix. In 2024, solar provided about 22% of Hawaii's total electricity. And Hawaii's governor, Josh Green, is really committed to decarbonization.

Kousha Navidar: And Ariana, you got to hear about that first-hand.

Ariana Brocious: Yeah, I wish it could have been there, in person. But I did get to talk with Governor Green about what it takes to transform an energy system and what the rest of the country can learn from a place that's often seen as far away, but may be a few steps ahead.

Ariana Brocious: Petroleum accounts for about 90% of Hawaii's total energy consumption. That's the highest share of any state, and Hawaii was the first state in the nation to set a 100% renewable energy goal by 2045.

Your administration has accelerated that timeline for specific counties, the three biggest islands, I believe, um, by 2035. So, how's it going? What's been hard?

Josh Green: Well, what's going well? Yeah. We, we believe in, uh, aggressively moving towards renewable energy for our state. I was the sponsor of, of the bill back when I was a state representative many years ago, and that's what kind of got the ball rolling. A lot of great allies and advocates altogether. So we've set this goal and we intend to achieve it. The challenge we have, of course, is that we're very isolated. We have a lot of people that travel across the ocean to Hawaii. That drives a lot of our need for fossil fuels at present. And then the militaries here also. You know, in some parts of our state we use as much as 40% renewables. In other parts, much less. And so what we wanted to do is we wanna meet the energy mandate. We need a bridge. And so that's what we're discussing right now. Having a, you know, a bridge to the future where we get to a hundred percent renewable as we pull off of oil. You know, we don't want to be using oil the way we have been for so long. It's of course very dirty. It's often expensive. Even now we're seeing spikes in, you know, fossil fuel costs because of the war in Iran. So there's so many different, you know, consequences of being in a global community that relies on fossil fuels. We're trying to wean ourselves off, and we're also putting extra efforts into all of the renewable options that we still have.

Ariana Brocious: Right, and you've said liquified natural gas, LNG, should be part of the mix as you decarbonize. That's not necessarily a popular position in Hawaii or among some climate advocates. I'm curious how you evaluate the options that you have in front of you as you look at ways to decarbonize quickly, efficiently, and try to not set up another dependence on another imported fuel source.

Josh Green: Right. So that would be a 20 year plan with significant subsidies from the private sector and the federal government. What people don't understand is that we have a 10% footprint of our population from the military, and they rely on firm power in ways that you can't even really

describe publicly. That's one thing. Second thing is that, uh, those who haven't thought this whole thing through. Don't realize what it would mean to have the federal government and the private sector supporting us because of the military presence in Hawaii. So we would not possibly do this unless we had major investment from other, you know, parts of the world. I'm cognizant of the fact that the federal government currently is, is not committed to renewables in the way it was recently, So meeting our goals is not remotely possible if I don't build a bridge. And right now the current circumstance, is that we're getting all of this, um, oil from across the country, including a huge amount of it from Libya. It's more dirty. It's more disconcerting than LNG, although I understand people would like me to be a purist, but if I'm a purist, number one, the costs remain extremely high. People can't afford to live in Hawaii. Affordability is by far the number one issue, and so if we put our heads in the sand and don't do anything, we just go slowly to the process of a renewable future. People are already paying the highest energy costs in the country, and people are leaving. So it becomes really very unjust to people, especially local families that don't have as much opportunity economically to stay. So there's a perverse situation where, uh, the very advocates that want to take a hard line position and tell me not to use any LNG are actually in effect shipping people out of the state, making local families leave because they simply can't afford it.

Ariana Brocious: So in terms of renewable energy, you know, I know you've been investing in solar, and there's a lot of possibilities for developing small scale systems that we've covered this in Puerto Rico, other places where there's a lot of microgrids, and this can be huge for communities that, you know, lose power regularly from a storm or something.

Josh Green: Yes.

Ariana Brocious: I also understand that wind is an option, but another thing that has gotten a fair amount of pushback, um, offshore wind, and this could generate a lot of power potentially. I'm just kind of curious again, what your thoughts are on that as part of the balance.

Josh Green: I personally like offshore wind. But there's a, there's a really, um, deeply entrenched nimbyism on some of these options. So, you know, you propose wind and then you have a community that is well established and they love their view. And Hawaii is all about the aina, the land and, you know, having the spectacular, uh, physical presence of the environment. And so people then oppose it.no matter what you choose, you will have some people that get very upset. Uh, that makes for a challenge. Uh, then there's geothermal, right? And geothermal I think is, I think very highly of it. But when you, um, raise the spectre of having a lot more geothermal, for example, on the big island where we have active volcanoes, , then there's a cultural question about whether or not we're abusing the land and taking advantage. So there's not any easy answer. Uh, the most sensible answer I can come up with is a, a balance of all sources of energy. Most heavily reliant is from my perspective on solar. Okay. And, and I'm completely committed also to wind and geothermal as a partner to solar. But then having a bridge where we use some LNG instead of you know, oil from countries that we may not even have access to in the somewhat immediate future. And it's a, you know, it's a compromised approach. Really what the goal is, is to get o over time to hydrogen. Hydrogen as one of the main sources in partnership with solar. And as hydrogen technology improves, and I'm hopeful that fusion, you know, advances occur. We do believe they will, that you can get to clean energy much, uh, more effectively. The other discussion that happens from time to time,is nuclear power. You know, we have concerns about that in the islands. Of course, there's also a constitutional prohibition on it, so you'd really be reaching if you went there, although people should be aware that we have a lot of nuclear reactors in the islands. They're just in the form of submarines. So our best bet would be gradually to move towards a partnership that can use hydrogen technology and solar technology and geothermal. And those are all very clean and I'm hopeful about the future, but we do need this bridge.

Ariana Brocious: Yeah, that's really interesting to bring nuclear in. 'cause I know that there's been some exploration by the military for small modular reactors. I think because they can be that firm power, that dependable power, with no emissions. So let's pivot a little bit. Hawaii is a clear leader in the climate space, in terms of setting goals and targets. Also, I would say you've already begun to experience many impacts from climate change. These include sea level rise and flooding, decreasing access to fresh water impacts to traditional agriculture, beach erosion. How are you thinking or working on ways to adapt to this present we're in and the future that's coming with increased warming?

Josh Green: Right. So we took a very bold position and we passed the first climate impact fee in the country. We went through a tragedy on August 8th, 2023, where we had the Maui wildfire, and everyone's, I think, aware of that. That fire took a hundred, two of our loved ones and displaced, you know, over 13,000 people and did $13 billion of damage. Since then, after seeing that Superstorm, there was a hurricane that passed through the islands and on the tail end of that hurricane, we had very dry weather. Uh, the land was dry, we've had drought. The fire broke out 'cause power lines came down and, uh, the fire was put out initially and then reignited and the coals, the embers flew into the sky with the, you know, the, um, hurricane force winds. And that's what burned Lahaina down. So after seeing that, we know that we, you know, that we just have to take better action against climate change and have resiliency for real. So I passed the climate impact fee, which is a 0.75% tax on any hotel stay or short-term rental stay. And that money now would go invest in perpetuity into these green fee projects. And we've already found that people. Um, accept this. We've seen an uptick in the initial months in tourism and spend. We've seen, uh, a commitment to doing this 'cause people are a part of the solution. We'll do resiliency projects where we can have more fire breaks and we can put more resilient structures in place. A whole piece of it will be, um, restoring shorelines and parks and preserved areas, you know, sustainable areas. A lot of nonprofits will receive grants. We had over 500 applicants just in this first year. Just started like two months ago. And, and this is, I think, an enormous step in the right direction because this gives us the ability to fund all projects that we've dreamt about for so many years. And this is my way to commit myself to the environmental community, even though I'm a part of it, honestly. As we build our bridge to the future with energy. Just to get us through and to decrease cost and to decrease carbon use overall. It's not perfect, but it gives us a real chance to get there and at the same time do something substantive, which has put hundreds and hundreds of millions of dollars over the coming, uh, years and decades into these projects to actually deal with, uh, the impact of climate change. And I think that a lot of other places in the world are gonna need to do this, especially if they're having fires or they're suffering sea level rise and having to deal with, you know, losing houses and losing land.

Ariana Brocious: This is really interesting to me because I think you're capturing something very special about Hawaii, which is that it is this point of pride for Americans. It's this incredibly beautiful place that has very special resources and people love going there. and so I'm really encouraged to hear you say that there hasn't been, um, that there's actually been an increase in tourism, that people are supportive of this. Because I had a question for you around the Lahaina fire wondering if, I know there was an initial dip in tourism, people maybe feeling it wasn't appropriate, but because that's such a big part of the economy, you wanna encourage it. So do you think that the fires affected the way the tourism industry operates and like the, the way that tourists approach traveling to Hawaii?

Josh Green: In the aftermath of the fire, there was definitely kind of, um, a traumatic effect. I'm a, I'm an emergency room physician by training in, in my life before this. And so there was a true trauma that occurred. And so, yes, on one hand people felt very sensitive about coming to Maui. Uh, and specifically they couldn't go to Lahaina because it was gone. Uh, so that had just a functional reality for people to deal with. Plus, as we went into the holiday season, it wasn't right for people,

they felt, and I understand this, to go to a place where so many people were devastated or displaced. I mean, I had, um, 8,000 individuals living in hotels for about a year. Uh, and we, you know, we made sure no one became homeless, and we really dealt with this in some incredible ways. But, uh, you know, people were staying in hotels while other tourists would be coming, so that created a, you know, a deep psychological challenge. Also, we needed people to come. Uh, a month after the fire, I began the process of opening up again another month, hence. So two months after. Just to let it begin because these were people's jobs and they had to survive. Most people wanted to work though. It was hard. Uh, so there were, there were definite challenges. Um. Now, having said all that, it's really booming now because we're rebuilding and, and we settled all of the cases without actual, um, lawsuits in court in less than a year.

No one's ever done that in the history of mankind. So we did that by really relying on the sense that we are a family here in Ohana, that's the word we use, even the partners, um, that you wouldn't expect to come together, like the energy company and the county. And normally they'd be suing each other, um, and the homeowners. We made sure that we healed faster, and that's why we settled everything. Uh, those who lost a loved one. There was one additional person that passed, so there were 103 fatalities in the end actually. 102 out of the 103 families, um, resolved the difference and, you know, are, are able to move forward now faster, many years, faster than normal. It's, it's heartbreaking, but we're moving forward and we're healing. That's what tourism looks like too here. And though there's, you know, a lot fewer places to go and stay in Lahaina right now. Um, it's coming back. We built 1,044 transitional houses. My team, the, the Feds with fema, we worked carefully together. because like you said earlier, people been here, they've come here for their honeymoons or their weddings and their kids' first birthday, so people love Hawaii. And I made sure to capture that, um, that sentiment with very conservative and very liberal politicians and very, um, you know, different groups that everyone had to work together to save this place. And that's why we are healing and recovering way faster. But now people are starting to come back to Maui. Now some of the, you know, short-term rentals are being rebuilt. The hotels are all essentially all unaffected. So, uh, it's extraordinary to see a lot of people that lived here and have made Lahaina their home for so long. It's gonna take a long time to recover, but I think 77% of all of the housing has either been already permitted or, uh, being rebuilt in, in the moment as we speak. And we haven't reached the third anniversary of the fire yet. So I think that that's pretty extraordinary. and we will be much more careful given the green fee impact and setting up, um, conservation zones. So we're doing things I think, right, and nothing will be perfect, but it's all a part of how we deal with climate and the land. And that's why I take both a very pragmatic approach to getting us to these incredible renewable goals. And also one that doesn't make it, you know, impossible for people to stay.

Kousha Navidar: Coming up, how does Governor Green handle a federal administration that does not support climate action?

Josh Green: I have some constructive leverage as we navigate the future of the military and the state of Hawaii. Our need to care for people that have limited means and the real impact on health and the environment. And I see all those puzzle pieces pretty clearly.

Kousha Navidar: That’s up next, when Climate One continues.

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Ariana Brocious: This is Climate One. I’m Ariana Brocious. Let’s get back to my conversation with Hawaii Governor Josh Green.

Ariana Brocious: I wanna pivot to another big important case that happened in Hawaii in 2024. The Hawaii Department of Transportation reached a historic settlement with 13 young people who filed a lawsuit asserting their rights to a healthy environment. And this settlement requires the transportation department to reach zero emissions by 2045. And what's especially difficult about that, I think, is it not only includes ground transportation, but inter island sea and air transportation, which are two very hard to decarbonize sectors. How is that process going? Where does that process stand?

Josh Green: Well, so it was my decision to actually settle that, uh, case that we call it the Navahine settlement based on one of the young women that was a part of the suit. And so I just thought we should have a landmark position on behalf of Hawaii in support of young people who were making the case that generationally they were being discriminated against because, uh, other generations, previous generations were leaving, um, this burden to them. And so we settled the case, and I think the other states in the country were shocked because nobody does that. Nobody ever did it. And you know, it, it seems, uh, incongruous with, you know, using LNG or, you know, aggressively having military presence here, but also coming together as a family. But if you really look just beneath the surface, that's what we're about. We have to compromise on behalf of what can be done, but also take the very, very visionary, uh, and compassionate steps like to the next generation to settle with them, to put out goals that are extremely thoughtful that the young people came up with to decarbonize air transport. That's gonna be very difficult, but it gives us the positive pressure to do it and to go after it and to have, uh, people, you know, invest in this, um, these different new technologies, it really makes it, um, something special for Hawaii to lead on. So we're doing a lot of different things. they all tie together and they're compromises.

Uh, but that's what we did. That's why we settled that in my department of transportation. You know, they raised their eyebrows at the agreement that I made. But, you know, they're aware that it's something that's important to young people, and I think a lot of times giving people hope that their government actually is considering what their aspirations are, is more than half the battle. And that was the case with the young people.

Ariana Brocious: Yeah. Yeah. As an ER doctor, how do you think about the health risks that come from the climate crisis, the climate disruption that we're experiencing and ways to be protective and to take care of the people of your constituents?

Josh Green: We have challenges because all throughout the Pacific we're seeing some of our Pacific Island neighbors who are. extended family. Also sometimes literally extended family, but certainly figuratively. They're losing their land, they're being fully displaced. The psychological impact of that can't be, um, it's not possible to overstate it. So that's a huge issue. Uh, then just as a doctor, when you see climate change and global warming, you see more heart failure and lung disease and all sorts of challenges. We have a very clean environment, fortunately in Hawaii, but extreme heat and drought do cause problems and lack of access to water is problematic, and lack of access to clean water is a huge issue and deal for us in Hawaii. So these are all very real challenges. That's why I had to pass the green fee. I mean, I had to pass a climate impact fee to generate resources. I really felt there was no option. Uh, but interestingly, in my first two years as governor, I was unable to convince the legislature to take that leap of faith until they realized that after the wildfire we really had no choice. And that's what came from the tragedy. And, and sometimes from tragedy comes opportunity, uh, to do good things or just an awakening. You have to sometimes, uh, play the hand that you're dealt. I've been dealt a much more conservative federal administration that's pulling back from renewables. But at the same time, I have some constructive leverage as we navigate the future of the military and the state of Hawaii. Our need to care for people that have limited means and the real impact on health and the environment. And I see all those different puzzle pieces pretty clearly as an individual. And that's what I'm trying to do as I put together the pieces that we've

discussed today.

How we get to our bridge to 2045 or even sooner on the neighbor islands. What energy combination do we use to pull back from our worst offender, which is oil from the Middle East? How do we settle with next generations and, and those who have been displaced in a way that is civilized and also aspirational? And then finally, what action do you really take, which was the green fee to put some money there to do something. And I think it becomes a fascinating case study. I can't say we've done everything right. Uh, but I'll tell you, if I don't, if I didn't do something on each of those, if I just walked away from one of those, um, solutions, the others would collapse. Because if we didn't have the green fee, we wouldn't have resources to deal with, uh, sustainability. If we don't have a bridge, there's no way I can meet any of the milestones because I still have far, far too much oil from previously Russia, now Libya and other countries. If I didn't settle the cases, no one would trust me. And so if you look at it in its totality, I think we've come up with a pretty unique approach to resiliency and climate.

Ariana Brocious: Josh Green is governor of Hawaii. Thank you so much for joining us on Climate One.

Josh Green: Thank you.

Ariana Brocious: Now let's hear from one of the young people involved in the lawsuit we spoke about earlier against the Hawaii Department of Transportation.

Rylee Brooke Kamahele is a climate advocate and was one of the youth plaintiffs in the lawsuit. She started working as an environmental activist when she was ten.

Rylee Brooke Kamahele: I live on Oahu and I live in the very center of the island. So I am basically like 20 to 30 minutes away from the beach at all times to 20 to 30 minutes away from like a hiking trail. My mom loved the water. So I grew up there and then my dad was a mountain person and so I was always out hiking outdoors with him. When I was younger, the beach was like a staple in everything we do. If we ever had spare time, we had an early day from school, that's where we would go.

I feel like when I was younger I saw a lot more like sea life swimming around with us. You could see the coral, kind of just like degenerate and die. And so plastic pollution was kind of my start and my in to activating for climate change.

Ariana Brocious: Yeah. Well, let's talk a bit about some of your activism. 'cause you've been civically engaged since you were quite young. What initially motivated you to take action in your home community?

Rylee Brooke Kamahele: I went to the beach one day with my mom and I saw a native Hawaiian sea turtle, like entangled, in fishing wire and just plastic., And I freaked out. I was probably like. Five or six, and I was panicking. , My mom of course helped me out. She called all the right people. The turtle was fine. But then that kind of led me into like a rabbit hole of why was this in the ocean? Why did people put that in the ocean for animals to get tangled in? Like, that's messed up. I started speaking on bills. My parents like to tell everyone that I was like raised in the capitol and our city council, Honolulu Hale is what we call it, because I was just there so often. Um, I spoke on bills against cetations in captivity, sunscreen bans. , I was a part of the plastic phaseout bill in Hawaii since I was 10 years old too. It took a really long time to get passed. There were a whole bunch of youth on that board and, I was like the youngest kid that was involved. And so I got to grow up with those slightly older than me youth activists and kind of just follow in their footsteps.

Ariana Brocious: You were one of 13 plaintiffs in the case Navahine versus Hawaii Department of Transportation, which was filed in June of 2022. You and your fellow youth plaintiffs argued the state violated your constitutional rights by pursuing fossil fuel based transportation policies and that those contributed to greenhouse gas emissions. As a plaintiff, what evidence did you give to demonstrate how these state level decisions affected your quality of life?

Rylee Brooke Kamahele: So some of the personal affects that I talked about in my statement was my food, and like staples and things that I eat, like poi being affected because of drought and just the plants not growing correctly. My Dad, like I said, is a big mountain person. We have a bunch of native plants that grow at our house that we eat also, and drought and just the crazy changes in weather really affected us that way and the food that we grow for ourselves and our animals. Aside from that. I talked about anxiety for my future kids and the kids that I work with and how are their futures gonna look. So really fighting for that next generation. I talked about being able to firsthand see the decrease in sea life and in the coral and just fish populations. And kind of seeing my islands, like my home that I grew up in, that I wanna raise a family in, degenerate right in front of me. , in 2021. So when we first started the lawsuit, when we were working with it, we were trying to figure out why I was having a bunch of health issues. Whenever we would have waves or like cold fronts, I would wake up and really bad welt all over my body, and then those would bruise and just stay on my body forever. And we found out that that was an allergic reaction to the temperature change being so crazy. . And up and down. And so we also included that 'cause I have a chronic condition.

Ariana Brocious: So you actually have a chronic illness related to the effects of extreme weather.

Rylee Brooke Kamahele: yes.

Ariana Brocious: I'm sorry to hear that. What was it like to be involved in this case? What did it feel like, to participate in the depositions and other things like that?

Rylee Brooke Kamahele: When I first got involved in the case, I kind of saw it as like a challenge because I've entered bills and resolutions, I've spoken on bills, I've talked to all of the senators and the representatives, but I never like sued the government like that. Like I've gotten awards from the government, but I've never been on that opposing end. The deposition was so scary. Before my deposition, , our oldest plaintiff went and got deposed and she had a bad experience with the other side's lawyers. And so it was just nerve wracking for us, sitting there for hours being stared down by somebody on the other side and them questioning your every move. She had a really fat stack of papers on like. Every little link she could find on me. And I had to go through every single one of them. I'm really competitive. And so I flipped it so that I saw it as a game. So it wasn't as scary and as nerve wracking for me. And so it was, it was a lot, but in the end it was worth it. We got the changes we wanted to see. So I'd go through it again.

Ariana Brocious: Well, yeah, let's talk about that. So two years later, the youth plaintiffs, you all and the state reached a settlement that commits Hawaii to decarbonize its transportation sector by 2045. This is a huge achievement in the world of climate litigation, and importantly, the settlement also recognizes youth's constitutional right to a life sustaining climate. What did you think about the outcome of this?

Rylee Brooke Kamahele: When we first heard we were settling. I think all of the plaintiffs were a little worried because it sounds like we're lowering our standards to meet theirs. Our attorneys sat on a long, long zoom call with us going over what every little thing in the settlement meant in that long, long paper, and we, we all agreed with it. The settlement was basically everything we asked for. I think there were like a few minor tweaks that the DOT was okay making for us. One of the terms of the settlement is a youth council and I'm one of the five plaintiffs on that, which is great.

And then one of the good things about our settlement also is that we can go back to court. , If anything strays from what we agreed to on the settlement. Yeah, so I, that's a little bit of reassurance for us, I guess, because if it somehow does flip and it does change, or they're not doing their side, we can take them back to court.

Ariana Brocious: Yeah. This is a really important decision, I think, for people in the climate world, but I'm curious what other people your age, other, you know, peers of yours in Hawaii think about it if they even know about it.

Rylee Brooke Kamahele: When we were going through seeing if we were going to trial and when we were, when we were going through court, we had a lot of different. High schools and middle schools, even elementary schools, talk to our attorneys or send letters and make videos for us, telling us how they're supporting us and they're backing us. And so that was really encouraging because we had adults trying to like, break us down and tell us that, , they thought we were suing the government for money. They were telling us like, what do you need the money for? They just didn't understand and they didn't really read into it. But we had a lot of youth support and I think that was very helpful. The first day that we went to court, we were greeted by a Hawaiian charter school and they did an oli, like a chant for us. And then they came and they sat in on our court hearing. And so we filled up both sides of the court with all youth and being surrounded by that was really strengthening, I think because we walked there, all the plaintiffs together and we were a little bit panicky. It's scary going into a courtroom and having attorneys against you. But it just made it such a better experience because we knew we had that support.

Ariana Brocious: Yeah. So you mentioned this, the state agreed to create a special council of young people to advise them on this decarbonization process, and you're serving on that council. What's been your experience of the, you know, so-called sausage making, you know, the real process of trying to decarbonize these systems? It's not just road transportation, it's also marine and air transportation. Do you think it's happening fast enough? What's been the experience there?

Rylee Brooke Kamahele: So we still are in the early stages of the council. The council itself is made up of really brilliant kids. And they have a really diverse council too. They have, a few people from every side of the island on every single island. And so every island gets to speak their issues and what they see in their community and kind of get their own constituents like words and their thoughts and involvement. One of the things that the DOT is trying to do right now is just educate the youth so we, we know everything that's going on and so that we understand all of the terminology that they're using, and so they've been bringing in a lot of experts to talk to us and make sure that we have everything in the back of our brains, and so we have that background knowledge on what we're going to be making decisions about.

Ariana Brocious: Hmm. That's great. That's really nice to have that level of attention. Why does youth input matter in crafting this decarbonization plan?

Rylee Brooke Kamahele: Youth input is so important because it doesn't come from like a biased place. There's no money involved for youth. It's really just we see a problem, let's figure out a solution. I'm not saying we don't think about the whole picture, but I feel like there's less boundaries. And that's one thing that I've noticed adults have a hard time with is they'll tell youth or, I've had teachers tell me before , well, that's not gonna be possible. How are you gonna get the money for that? Oh, that's, you need to think smaller. But youth come up with those big, crazy ideas. And then I think from this council specifically, we all are very future driven. And so we think far in the future. And one of the principles I like to use is the seven generation principle. And so I like to think, obviously seven generations down the road and see how it'll affect them before I make decisions. And so, kind of just having that principle intertwined in the Department of Transportation,

I think will be very helpful down the future.

Ariana Brocious: I like hearing you say that, that, you know, youth don't think in the same limits maybe that that older people do. And, have just a broader sense of what's possible that's, that's really, encouraging. So, I think there's a lot of kind of generational strife tied up in climate change. I feel this, I feel my generation is kind of inheriting a pretty crappy situation, and your generation is too. And so I'm wondering how you feel about older generations and what responsibilities they have to addressing this problem.

Rylee Brooke Kamahele: I think that older generations could have done better and they were a little bit, we say hard head in Hawaii, which is basically just like they didn't listen the first time or at all. But I don't resent them for it. I think that now my generation, even your generation has a lot better technology that tells us about climate. And so I think that now we need to focus on the future and going ahead and not resenting the past generations, but thinking about how we can make it better for the future generations with the technology and the data that we have.

Ariana Brocious: As you look ahead, this huge success already kind of, you know, behind you, but it's still being figured out and implemented, how do you feel about the threat of the climate crisis?

Rylee Brooke Kamahele: So in elementary school, you learn about supply and demand, right? Obviously Hawaii decarbonizing is lowering the demand of fossil fuels needed in Hawaii. We're not gonna use gas as much. We're gonna try to provide other ways of transportation, going electric, going hybrid, doing as much as we can until 2045.

I don't think that the fossil fuel company should be trying to make more of a supply. I think that they should be conforming to what we're demanding and what the supply is changing to: going electric, finding different ways to fuel things that aren't harming the planet. I talked about in my statement, that I have such bad anxiety over these future generations and how it's gonna affect them. My disease that I have is also degenerative, and so we don't know how it's gonna degenerate and what's gonna happen in the future. When I was having those Allergic reactions to the temperature change, that was when I first got diagnosed, so now it's even worse. And it's only gonna go downhill from here. So we're, it's concerning because there are people that have the same disease that I have that can go into like anaphylaxis over things like that, over temperature change, And so it is terrifying. It's scary. But I'm gonna just do my best over here with the time that I have.

Ariana Brocious: That's so admirable. Thank you for sharing your story with us and, and a bit of the work you've done in Hawaii.

Rylee Brooke Kamahele: Of course. It's so nice to talk to you

Kousha Navidar: Coming up, scientists aren’t sure what the future holds for our rapidly warming oceans – but they’re trying to figure it out.

Tessa Hill: there's really no equivalent in earth history to what is happening today. So the rate of change is so fast today that it actually limits our ability to learn lessons from the past evolutionary record.

Kousha Navidar: That’s up next, when Climate One continues.

Ariana Brocious: This is Climate One. I’m Ariana Brocious. Oceans cover more than 70 percent of the planet and help regulate the climate that makes life on Earth possible. Scientists like Ayana Elizabeth Johnson estimate that without the oceans absorbing heat from the atmosphere, our world would be a whopping 97 degrees hotter than it is today. Absorbing all that heat is affecting ocean

ecosystems in profound ways.

I talked about this with Tessa Hill, a professor at the University of California, Davis and author of At Every Depth: Our Growing Knowledge of the Changing Oceans.

Tessa Hill: Many things are changing all at once in the ocean, largely due to human impacts. We're seeing heating of the ocean due to global climate change. We're also seeing a decline in the amount of oxygen in the ocean. So as we, as we get those ocean waters heated up, the oxygen actually kind of escapes the water, because the water can hold less oxygen in those heated conditions. And then there's a chemical change happening in the ocean, which is what we call ocean acidification, and that's simply because the ocean absorbs about 30% of that carbon dioxide that we put in into the atmosphere through our human activities. And so as the ocean absorbs that, the chemistry of the ocean fundamentally changes. And so if you're an organism in the ocean, you're seeing all three of those things change at once.

Ariana Brocious: So let's speak specifically to fish. Are those stressors necessarily bad for fish?

Tessa Hill: They aren't necessarily bad, but what we generally see for fish and invertebrates is that they have sort of a tolerance zone in particular for temperature and oxygen. And as those things change out of their tolerance zone, if you're a fish and you can move, uh, you may attempt to move. If you're an invertebrate, like a mussel or a clam or an oyster and you're attached, you're kind of stuck.

Ariana Brocious: And so relocating or moving to perhaps a more moderate part of the ocean might be a strategy for some organisms. I wanna talk about the pace of change because obviously we know that species adapt and evolve and are these conditions things that fish can evolve or adapt to?

Tessa Hill: In terms of the pace, in a nutshell, there's really no equivalent in earth history to what is happening today. So the rate of change is so fast today that it actually limits our ability to learn lessons from the past evolutionary record because we can't find time intervals in, you know, earth's history and evolutionary history that match today's rate of change. And then I'll just sort of a layer on the fact that many different things are changing at once. And so for a lot of organisms along the coast, they're seeing not just one stressor, but maybe two stressors at the same time, you know, reduced oxygenation or a change in pH or both. And so we see organisms both contending with multiple challenges at once. Multiple changing parameters at once, but also sometimes they're getting hit in sequence by stressful conditions.

Ariana Brocious: So given all that, how do you think about ocean health when we're thinking about fish?

Tessa Hill: You know, when I think about ocean health, I certainly think about, , changes like oxygenation and ocean acidification and temperature change. But I also think more broadly about ocean health, so we might also think about how we're carefully managing the resources of the ocean and fishing in the ocean. That's part of a healthy ocean. We also think about other pollutants, like plastic pollution in the ocean. And it also means thinking about how we manage the ocean carefully and perhaps set aside parts of the ocean for conservation purposes.

Ariana Brocious: So In terms of where fish live, um, how they grow, how they reproduce, what are some of the trends that you're seeing with the fish that people commonly eat, like cod, tuna, salmon around the world?

Tessa Hill: In general, probably the most powerful and interesting trend that we're seeing is that

those fish are changing the location where they're living. And so we're seeing in the Northern Hemisphere, as water temperatures warm, what we see is sort of a northward march of marine species. And so species that you know, have been fished along the northeast coast of the United States are starting to migrate northward into places that they were not previously located. We're seeing the same thing on the west. coast of the United States, And fishing communities who are, relying on those species as the, the, you know, the subject of their, their catch and contributing to our coastal economies are having to adapt and move with them.

Ariana Brocious: That's a big deal. If you've a multi-generational cod family, that's gonna change a lot, right?

Tessa Hill: Yeah, so I think this is where we start to talk about how climate change then forces climate adaptation on our part. So the fish themselves are adapting, which is what you've been getting at. But that means those of us who are reliant on those fisheries are also required to adapt. And that may mean fishing in new places, in places that are farther away or harder to get to, which makes it more expensive. it also means fishing for different species. And so that may require changing, you know, the gear on your boat or the type of boat you're using, or the number of people that you take out with, you know, your crew. And so all of these things are time consuming and they're expensive, and we're sort of asking the fishing industry to pivot very rapidly because of these climate change impacts on their industry.

Ariana Brocious: And can you just give us a sense what proportion of kind of the world's protein comes from the oceans, because it's quite a lot right?

Tessa Hill: Oh yes. it's a significant amount of the world's protein comes from the ocean and, we often don't think about this in the United States because we tend towards other protein sources to some degree. But if you look globally at countries around the world, um, the ocean provides a very significant amount of protein. And I'll just add in that in the United States, interestingly enough, we import most of the fish and seafood that we eat is brought in from other countries. And so it's sort of interesting thinking about, you know, ways that we can support our own local fishermen, and actually consume fish that's been caught within the United States, but also it means, you know, supporting people in this, this climate adaptation path that we're on.

Ariana Brocious: Would you say there are particular species that are emerging as winners or losers in this, changing ocean environment?

Tessa Hill: I will say with invertebrates, I think there are winners and losers. Um, and a lot of it has to do with whether or not they're sort of tolerant of a wide range of conditions and or can adapt rapidly to changing conditions. We see a lot of variability in how organisms in the ocean respond to changing environmental conditions. And that's a good thing because anytime there's sort of a variety of responses that tells you that there's a little bit of a window. There's a potential for adaptation and there's a potential for species that are gonna be robust to these changing conditions. And so I think there's a couple ways that we help. One is that we fundamentally have to address the challenge of climate change. We have to address the emissions of carbon dioxide to the atmosphere. That is the underlying challenge, you know, that we're addressing through this whole conversation. But the other thing we can do is sort of arm organisms with some, some tools, um, to adapt and to be safe and resilient in these changing times. And one of the ways we do that is through conserving areas of the ocean that can be sort of refuges as, as the world changes quite a lot. You know, building stronger connections between our coastal communities and our scientific community is something that's really important and also really, you know, gets us moving in the right direction. Along the US west coast, there are tons of examples of sustainable shellfish farmers who are working hand in hand in partnership with scientists at universities to try to address climate change. And there are

also examples of researchers at Oregon State University who have worked very closely with the fishing community to get oceanographic sensors for things like temperature and oxygen, put right out onto the fishing gear so that we can understand how the conditions are changing, right where the fishermen are catching fish and crab. And so it's a great partnership because the fishermen are basically contributing a huge resource, which is that they're out on the water every day. They know the water better than any of us, and they're, you know, helping scientists get sensors in the water right where it matters for the fishery. And I think that's a great example of thinking about how we adapt together because in order to adapt to climate change, we need to know where it's happening. We need to know where the impacts are, and so it's not something we can go into with our eyes closed. We need all of the eyes on the water, the fishing community, the coastal community, tribes, scientists, everybody.

Ariana Brocious: Yeah, Tessa Hill is an oceanographer and professor in the Earth and Planetary Sciences Department at the University of California Davis, where she teaches and researches oceanography and climate change.Tessa, thank you so much for joining us on Climate One.

Tessa Hill: Thank you so much for the opportunity. It was a great conversation.

Kousha Navidar: Hey everyone, it's Kousha and Ariana. It is the end of our show and that means it's time for Climate One More Thing. Ariana, what do you got?

Ariana Brocious: Yeah, I read a great article earlier this week that was about successes and iterations in getting electric buses to work in cold climates. So, uh, basically the story is that the city of Madison, Wisconsin, which is a college town, began rolling out electric buses, I think a few years ago. And they were having a lot of issues with them because batteries don't do that well in cold temperatures. Right. And Madison gets like legit cold. Cold. So cold. Yeah. Um, but they didn't let that defeat them. you know, the technology continued to improve and the city itself actually installed overhead chargers on certain routes. And basically now the buses are doing great in cold weather, including when the temperature dropped to negative four degrees Fahrenheit.

Kousha Navidar: Wow.

Ariana Brocious: Um, so the actual university shut down because it was so cold, but the buses kept going, but the buses

Kousha Navidar: still ran. Oh, that's great. Yeah. Did the overhead chargers make a difference with like the cold adaptation?

Ariana Brocious: Yeah, they seem to help the batteries kind of like fuel up quickly as needed. Um, because I think the main thing that happens with batteries and cold climates is that they just lose their charge much more quickly than they would in warmer temperatures.

Kousha Navidar: But when you have kind of like top up stations along the way, it. Makes it possible, even if it's draining faster. Yeah. That's really cool. You know what's really funny? Uh, my climate, one thing this week is also about public transportation going electric, but it's not in the us great minds. It's, oh, tell me more.

Right. Great minds. Oh, thank you. I feel so flattered to be in the same like brain spaces with Ariana Brocious. Uh, I. I found this article about Stockholm having a ferry that flies like, not literally, but, but almost the, it's called the Candela P 12. It's like a 30, about a 30 passenger electric boat that's got three carbon fiber wings mounted beneath the Hull.

Wow. So as it. Picks up speed. The wings generate lift underwater like the wings on an airplane and

it raises the entire vessel above the water and it cuts drag, it runs on electricity and it uses a fraction of the energy of their normal ferries that, uh, use diesel. And to put it into perspective for you, the travel time is nearly cut in half 'cause it's faster and the carbon emissions go down 94% compared to diesel. And that matters because even though ferries are a small part of Stockholm's Transit Network, the diesel ferries account for nearly half of the city's total public transport emissions. So that's pretty cool.

Ariana Brocious: That's incredible. Yeah. Yeah. And also you're riding on a flying boat, right? That is so cool.

Kousha Navidar: Uh, I get pretty seasick. Do you?

Ariana Brocious: I don't, thankfully. Okay. Because I really, really like being. at sea.

Kousha Navidar: Yeah. So I, I just wondered how it would feel to be on it if you're like, even higher up in experiencing the waves, but, uh, I don't know. It sounds cool.

Kousha Navidar: Thanks for listening. Um, listen folks, do me a favor. If you like what you hear and you wanna read, you like reading sign up for our newsletter. We're at climate one.org. Check it out.

Kousha Navidar: 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.

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