Ashanti Blaze Hopkins: Welcome to "Doing What Works: Exploring the Blue Economy," a podcast series that dives deep into the vast potential and challenges of the blue economy. I'm your host, Ashanti Blaze Hopkins, Interim Associate Dean at Santa Monica College's Center for Media and Design. Together, we'll navigate the uncharted waters of this exciting and rapidly growing sector. Joining us on the podcast today is someone whose career has been solidly anchored in the wonderful world of algae. She has a Bachelor of Science degree in Chemical Engineering from the Colorado School of Mines and has worked at the US Department of Energy for more than a decade. Currently, she is the Technology Project Manager for the Advanced Algal Systems Program in the Department of Energy's Office of Energy Efficiency and Renewable Energy's Bioenergy Technologies Office—try saying that five times fast—Christy Sterner. Thank you so much for joining the podcast today.

Christy Sterner: Thank you, Ashanti. Thank you for having me.

Ashanti Blaze Hopkins: Absolutely! So, our first question for every one of our "Doing What Works" podcast guests is always the same: What was your first job ever, and what did you learn from that job that helps you do the work that you do today?

Christy Sterner: Boy, this probably sounds funny because I'm going to go way back. I would say my first job was as a cashier at Target. And you're probably thinking, "What does that have to do with what I do now as a project manager?" It has to do with people. Every job I've ever had, starting with that one all the way up through this one, has to do with people and the relationships that we have—how we treat and support each other and how we make things happen by working together. So I have carried that all the way from being a cashier through the job I have right now.

Ashanti Blaze Hopkins: It really is. Everything we do is about people, isn't it? The connections we make—all of those things. So, take me through how you started on this trajectory towards working for the US Department of Energy, and at what point in your formative years did you think, "This is exactly what I want to do"?

Christy Sterner: That's a great question, and it's kind of an interesting path. I mean, I think so anyway. Going from being a cashier, obviously, I went into college and I thought, you know, I have loved science, technology, math—the whole bit—my whole life. As well as, I was born a tree hugger. Born a tree hugger from very, very young—that's what it was all about. I cared about our planet and life on this planet, and I thought as I grew up, I wanted to combine the two. So, when I went into engineering, I wanted to do an engineering job that actually helped our planet and helped us as people on the planet. I started off with a research and development company where we looked at extracting not nice things from different types of materials so that those things didn't end up in the water table, or in the soil, or in the air. And, so, that appealed to me immediately, which made me just love my first job out of college.

However, the company took a different direction, and I decided to look elsewhere. So, I found an ad for a Department of Energy job, and I read about it and did some research and thought,

"Hey, now this sounds like something that I would like and something I could explore." I didn't know anything about the government programs and what they offered and all the cool stuff that they actually do and fund. I decided to apply and check it out, and I got the job, I'm happy to say. Many, many years ago—it's probably been, my goodness, 24 years now that I have been with the Department of Energy. I started off as a contractor in the bioenergy technologies program, looking at all different aspects of conversion, like thermochemical conversion, biochemical conversion, feedstocks, scale-up projects, you name it. But it was all in renewable energy, which was very attractive to me.

As time progressed, we started looking at algae. It wasn't something that had been studied—it was studied early on in the Department of Energy, like in the early '90s, and then it faded away. It came back around 2009-2010, which was perfect for me because it allowed me to go, "Oh, I want to do that. I want to learn about algae. I want to know about how this stuff can go from the icky stuff that we think is so gross on pools to something that's really cool that we can make a change with." I have to say now, I am an algae cheerleader. If you ever want to hear somebody go, "Rah! Algae is awesome!" I am your person. I am all about it and happy to share it. We do lots of cool stuff in the bioenergy program, but you know, I'm very passionate about algae.

Ashanti Blaze Hopkins: I love that—algae cheerleader. That's a t-shirt you should have printed and wear proudly everywhere you go.

Christy Sterner: I do have a little meme that has little pea green poms and the whole bit.

Ashanti Blaze Hopkins: Great, I love that. So, tell me, how and when did you first learn about the blue economy? Because it is very much related to what you're doing. What was your initial take when you heard the concept of that?

Christy Sterner: So, I think just the name attracted me. I had heard it referenced before, but I didn't know a whole lot about it until I was introduced recently to the BECAP project—B-E-C-A-P—and when I was introduced to that project, I went and did some research on the blue economy. I went to the website, which is awesome, I might add, and I read all about it. I read about the BECAP project and everything and thought, "Wow, this is a program and an ideal and an objective that is very, very synergistic with what we do in the bioenergy technologies office and what we do at the Department of Energy." There are so many things that are just right in line with what we do, and I thought, "This is very cool." This is focused on this blue economy—there's a lot of water activity and things like that. Of course, getting back to algae—that's what I do—but it also coincides with everything that bioenergy is trying to do. That's to make things better where we're at, get away from petroleum, use our renewable resources, and make life better all the way around. Clean up things and keep them clean for generations to come.

Ashanti Blaze Hopkins: At the US Department of Energy, you are the lead of the agency's Algae Prize competition. Part of the blue economy is this concept of algae as a renewable

energy source. Can you tell me more about how the Algae Prize competition came to be and what DOE hopes to accomplish with this effort?

Christy Sterner: Oh, I love to talk about Algae Prize. I'm very happy to do that. So, Algae Prize is a task within one of our larger projects known as ATEC, our Algae Technology Education Consortium. Algae Prize is funded through that project. It is a big deal. The ATEC project looks at curriculum and workforce development and education on the entire algae value chain. Algae Prize is a part of that, but it's a very, very cool part in that it's a competition for high school students all the way through graduate-level students in the United States. So, we have had teams and participants from anywhere across the United States and Puerto Rico. We've had some amazing teams from Puerto Rico. As it has evolved, they basically do projects for an 18-month timeline or so on anything and everything you can think of in the algae value chain. It's anything from cleaning up water to growing macroalgae to looking at different aspects of the microalgae processing chain, looking at products. There are some very, very cool and interesting and innovative ideas out there that have been in the Algae Prize.

The current one that's open has 15 finalist teams. Each one of those 15 finalist teams won a cash prize to do their research for the next 16 to 18 months, all of which culminates in what we love to call Algae Prize Weekend, which is a great time in April where the students all come out to the National Renewable Energy Lab campus, and we host just a variety of very cool things. We host a tour, but most importantly, they compete with each other by presenting their projects—how their research went, what the results were, what they want to do with it going forward—and they present that to a panel of algae industry experts. Those experts ask relevant questions to the research they're doing, find out what happened well, what didn't happen so well, what did you learn from it, how does this help the industry? Plus, we do roundtable discussions with industry members in both the national labs, academia, and in the industry itself, which the students love. It's making those connections; it's building those relationships, starting to build them now so that they can see where they have a future in the algae industry. That weekend culminates in the awarding of five champion teams and then a grand champion. The Algae Prize—the first one that ended in 2023—was amazing. These teams are just incredible, and so we're really excited about what 2024 is going to look like going into 2025.

Ashanti Blaze Hopkins: I know we've been talking a lot about algae, and for the folks that are listening, they may not know exactly what that means. So, let's talk about algae as a renewable energy resource. To the regular person, who knows nothing about the world of algae. What does this mean, what is this concept and why is it important?

Christy Sterner: That's an awesome question and I think generally I was one of those people one day a long time ago. What is a renewable energy resource and why do we care? Well, renewable energy resources are resources that we have domestically, we can use right here, that are renewable. Meaning they don't go away, they come back and we can reuse them and do what we do with them over and over and over. And that's hugely important because that means we're not dependent on foreign resources, which cost a lot of time and money, plus it costs us jobs. I mean, it costs the workforce. There are lots of things tied to that. And so being

able to utilize a domestic renewable resource gets us away from that dependence. Plus it allows us to grow our own workforce. I mean, the benefits are amazing when it comes to using a renewable resource.

So algae is one of those renewable resources. Just for layman's terms, I mean, sunlight obviously is a renewable resource, water—talking about the blue economy—water is a renewable resource if properly handled, most definitely. Biomass, which algae is a part of. So most people think of algae and they see it as the slimy stuff on rocks or they see it in ponds and they think, "yuck!" Or sadly, they hear all this negative press about harmful algal blooms and they think it's terrible stuff. Well, there are algal blooms out there that are dangerous and have constituents and characteristics that are not very pleasant, but properly handled, they could actually be turned into a very, very useful renewable resource. Plus, there are many algae resources out there that are not harmful and that can be used as building blocks for fuels, chemicals, products like surfboards, tennis shoes, clothing—you name it. Those constituents come out of algae and can be used to build just about any kind of product you can think of. So all of that ick that people normally think of in layman's terms becomes something really cool going forward.

Ashanti Blaze Hopkins: That's pretty incredible, especially if you're looking at the younger generation. They're more conscious about where the things that they are using come from, how they are created, and whether they come from renewable resources or are man-made. So I think a lot of students and potential students are thinking about how to get into industries that make them feel like they are making a difference, right? Can we talk about the algae feedstock logistics project? Why is it so important, especially for students at both the high school and college levels, to be exposed to the idea of bioenergy and the workforce that's going to be needed now and into the future? What is really at stake here in making sure these students have early exposure to these concepts?

Christy Sterner: I actually think you provided the best lead-in when you said these younger generations are thinking about where their things come from and how they can get into fields where they can make a difference, where they are using something or doing a process that makes a difference for this world. And I think that's probably more prevalent now than it has ever been. I mean, some of us have always thought that way, but it's definitely a positive thing to do now. So it makes what we do with the algae logistics projects very important because we're trying to develop that workforce. We want students at all ages and all levels to be excited about this and realize that science industries aren't just about being stuck behind a computer or in a lab. Some people enjoy that, and that's perfectly fine, but maybe they don't realize that the stuff that went into some very popular name-brand clothing is made from algae. Or that you can make car parts from plants or carbon fibers from agricultural waste or algae skimmed off a pond. You can make amazing things. So getting younger generations interested and excited about these opportunities that were once thought unrealistic but are now very real is crucial. We need to foster their enthusiasm and unique ideas now, get them involved, develop a skilled workforce, and keep these industries moving forward.

Ashanti Blazie Hopkins: What are we doing really well here in the United States in regards to the blue economy, and what can we learn from what other nations are doing really well?

Christy Sterner: I think what we're doing well now, in particular, is taking notice. I think that's a big first step is that there is a lot of interest in what we're doing in the blue economy and with bioenergy and with algae. And these aren't things you heard about really, in my opinion, 10 years ago or 15 years ago or 20 years ago, and now you are. And we have an administration that is supportive of positive pro-environmental things and positive about climate change and making things better and cleaning things up and doing processing in a smart, effective, sufficient, and efficient way. And I think that we're starting to do that really well. We're getting the research dollars out there. We're getting folks interested and excited about it. We're training the workforce. And people are looking at things differently when they see the ocean. You know, you don't look at it the same anymore. You don't look at it as, isn't that amazing? Oh, isn't that pretty? Now it's, do you know all the amazing things that live in the ocean and all the cool things that we can do that sustain our oceans but also help us on land and give us power and give us energy and give us food and all kinds of things and how we can do that sustainably. So it's very cool to see that. I think we're learning to do that better and look at things in a more positive, kind of reciprocal way. It's not use and it's done. We can't do that. We need to use things and renew them and use them in a smart, sustainable manner. So I think that's a very, very big positive of where we're headed and where we're at right now.

As far as other nations, I do know there are lots of places that do this. For example, using macroalgae, that's not new around the world. It's pretty new around the US on macroalgae just because we haven't really gone into that industry much, but we're starting to. And also, I think things on the more renewable side, obviously recycling. I realize this doesn't really have to do so much with that, but recycling stuff is very important and done really well around the world in lots of places because they don't have the land and space that we do. And they recognized early on we have to take those resources and waste is a resource and utilize it smartly. And so we can't just bury it or ignore it. We can't throw it in the ocean and stuff like that. We have to do something smart with it.

Ashanti Blazie Hopkins: Based on all the research you've done throughout your career and your more than two decades at the US Department of Energy, what is your dream state for the blue economy in this country, especially in the area of bioenergy?

Christy Sterner: I can tell you I'm a nerd. I'm an engineer, so I love graphics. And I wish you could see the graphic in my head on this. My dream state would be that we would utilize the technologies that I know are available right now, but also are up and coming to where we have a circular bioeconomy where we take these cool new technologies that we have, we utilize the renewable resources that we have locally for them, and we create the materials that we need to sustain our lives the way we like them. So we make the fuels and the chemicals and the products that we like and that we need. And then we take the waste streams from those, and we recycle those waste streams right back into the same system we started with. It sustains food, it sustains us, it sustains life, it keeps the oceans and the waterways clean, it keeps things out of

landfills, and it's this nice circular picture of everything feeding into what we're already doing. That's my dream state.

Ashanti Blazie Hopkins: So what do you think is needed for that dream state to become a reality, and how far do you think we are from that dream state? What are those barriers that keep us from getting there?

Christy Sterner: I think we're headed there. I think we will eventually get there because we're going to have to. For starters, a lot of our resources are not finite, so we're going to need to look at renewable resources, and we're going to need to utilize them in a smart way. And so I think we're headed down that path, but we have a long way to go. I mean, research and development doesn't happen overnight. You can get some amazing technological breakthroughs, which is what we're always looking for, but it takes time to implement them. It takes time to change, and that includes people's thought processes and what they're used to. So change is difficult, but I think it requires continued R&D, it requires scaling up, it requires outreach and education. That's a big one, getting more people involved. And it kind of leads back to your first question, to make this happen, it's about people. It's about relationships. It's about educating and getting input from folks that have ideas about how this can be a reality and what their role is in it, and to realize that everyone has a role in this, all the way from just the products you utilize to being on the cutting edge and making those new technologies and those new products happen. And so it's about all of us working together. I think we're headed down that path. I do think it's going to take time. It's going to take credits and incentives and policies and continued funding to make it a reality. But, I mean, at least where we sit right now, I think that's going to happen, and I'm excited about it. There will be major breakthroughs, you know, in the next year, in the next five years, in the next ten years, but eventually I think we will see this dream state that I talk about. I think everybody will see it as a reality.

Ashanti Blazie Hopkins: Resident Algae Cheerleader Christy Sterner, thank you so much for sharing your insights and expertise with us, and thank you for joining us on this incredible journey through the blue economy. We hope this episode has inspired you to explore further and learn more about this vital sector. If you enjoy "Doing What Works: Exploring the Blue Economy," be sure to subscribe to our podcast and leave us a review. Stay tuned for more exciting episodes that push the boundaries of knowledge and open new possibilities. Until next time.

[Music]