**Flinders University**

Fearless Conversations
Episode 6 – Environment & Sustainability
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**SPEAKERS**

Laura Trotta, Kyra Reznikov, Clare Peddie, Dr Ben Heard, Professor Corey Bradshaw

**Clare Peddie** 00:08

Hello, I'd like to welcome our virtual audience to the sixth fearless conversations event, a collaboration between the advertiser and Flinders University. It's about being brave in our thinking about how we drive South Australia forward and challenge ourselves to position this great state for success in the future. We're about halfway through our series now. And for each session, we've assembled a team of thought provoking leaders to explore their views on the opportunities and challenges that we face in relation to each topic, and today we explore the environment and sustainability and how it will influence si now and in the future. Feel free to join the conversation through Twitter using the hashtag fearless conversations, or in the comments section on advertiser.com.au. I am Claire Peddie, the science journalist with the advertiser focused on climate and environment. And I'll be facilitating today's discussion, and encouraging guests to be brave as we talk about the environment and sustainability. Before I introduce today's panellists, I'd like to acknowledge that we are meeting on traditional Land of the Kaurna people of the Adelaide plains and pay respect to their elders past, present and emerging. We recognise and respect their cultural heritage beliefs and relationship with their land. We acknowledge that we are, they are of continuing importance to the Kaurna people living today and also extend that respect to other Aboriginal language groups and other First Nations. Today we are joined by and not in quite the same order. Maybe I will do the audit. We are joined by Laura Trotta, who's an environmental engineer and award winning sustainability educator by Ben Heard. He's a consultant with Frazer-Nash and focus on energy. And then Professor Corey Bradshaw global ecology professor that is at Flinders University. And finally, we have Kyra Reznikov, who's an environmental and planning lawyer with Finlaysons Lawyers get it right. So welcome all, and First up, I wanted to ask to each of the panellists on the subject of being fearless. How can we be brave and bold in our quest for sustainability? What's something we can do differently?

**Laura Trotta** 02:51

That's an open ended question. I think, I think there's champions of this, I think there's what we can be fearless as an individual. And obviously, what we how we can be fearless as a society, you know, and a region so Adelaide as well. So feel as as an individual, it's really, to me, it's all about having the courage challenge, having the courage to challenge our governments and our politicians to do better, having the courage to challenge our, our industry and our corporates, corporate companies to do better, but also having the courage to challenge ourselves and our sphere of influence our friends and our families to do better when it comes to sustainability and make the changes that are going to make the difference, you know, now own lives and reduce our own impact. So I think that's one aspect of, of individuals, but obviously, you know, being fearless as as, as companies and organisations and universities and governments, we also have to have that courage to, to move forward in this journey set, set the targets, move towards the targets, you know, being being net zero, or, you know, reducing biodiversity loss and protecting more native areas. Having that courage and having that courage to do that sooner rather than later. Stop putting things off.

**Clare Peddie** 03:59

Okay, then what?

**Dr Ben Heard** 04:00

Yeah, I think they're fantastic thoughts from Laura, I think that needing to be open to new ideas is very, very important. And we often feel really frightened of new ideas that might be challenging, the way we've been thinking about a challenge for a long time. So we've got to be able to have very open and honest conversations about what we've got in front of us. And I think another way that we need to be fearless is to really embrace the long term here. You know, I think that the, we too often set aside the scale and the challenge, and the real timeframes we're dealing with in tackling some of the big challenges we've got but also the big opportunities that we've got, they don't normally come to fruition over five or 10 year horizons. They're more generational and even multi generational. And so I think that we've got to be prepared to get on dare I say at a slightly less humble footing and think quite big about the the challenges we've got With some some very bold, long term visions of what the future can be, and come backwards from there to where we are today and set that as our as our boundaries. So actually get quite excited about the future we can create, not just the future that we're just we're trying to avoid. And you know, I think that that takes its own sort of courage to come out of that frightened spot about the concerns we have for the future, and instead go to Okay, I've done that bit now. I've had my fear, I've had my grief in some respects, for what I feel we're losing. And now I'm ready to think positively about, about what I want to build. And I think that that takes courage actually. And we need to be fearless in fearlessly optimistic, can I can I perhaps put that out there, I think we need to be fearless, optimistic.

**Clare Peddie** 05:50

Nice. Cory,

**Professor Corey Bradshaw** 05:53

I often get us or at least the sentiment gets forward. And you hear this in the news a lot, you know, especially at the national level, Australia doesn't have a big footprint doesn't matter what we do. Even if we were the top of the Top of the Pops kind of thing, we wouldn't still make much of a dent. Well, that's, that's, that's backwards thinking. Because it's, you know, South Australia's really realised how lucky we are, throughout the pandemic, we have come through this relatively unscathed. And part of that is because we have a small population, but we can shift things and we can control things very quickly was in more populated states and other parts of the world. That's a major impediment just because there's so many players, we have the opportunity to move the players around a little bit more freely. And so we can make bigger decisions. And it's not about our overall impact. Yes, that's going to help. But it's going to be showing people yeah, you can do this. And we have the means to do that. Well, we're a wealthy nation and a well, a wealthy state, we have a very good standard of living, we have freedom to move around. And we have all sorts of opportunities just waiting for us, we just have to make the leap. A lot of people think South Australia is a little bit more staid. But I think that's a that I think the pandemic really shows us what's possible. Whereas it's, you know, the, the big, fast, shaking, moving big cities around the world. Now, they've been really struck by their input and the impotence to move forward. And a lot of these directions, we have that response, we have that capacity.

**Clare Peddie** 07:27

Okay.

**Kyra Reznikov** 07:28

I think I think building on what has just been said, For me, it's really about being willing to embrace change. No, it's I know, it's even in my own personality, to feel comfortable doing things the way that they've always been, and keeping continuing with things that are safe and comfortable. But really, to be able to move forward, we have to accept that we're going to have to start doing things differently. And there will be some change. And it has been said there might be some short term inconvenience, there might be some short term cost, but we've got to embrace that change, to really be able to move forward in a genuine way. All right,

**Laura Trotta** 08:06

and notwithstanding all that, just to build on that, again, is South Australia, we have a bit of a track record of being fearless in this space. You know, we've got the first container deposit scheme in Australia we were the first to ban a single use plastic bags and the first ban on single use plastics, you know, we got the first big battery so South Australia has been fearless and brave. And we're at a perfect place right now to just capitalise and continue to leverage from the successes that we've had to be a true leader and the global stage in sustainability.

08:36

I agree there's something nice about South Australia, that's sometimes it's just the right size. Yeah, for some change. Not not always that easily. And sometimes we feel a bit small, sometimes it's it's lost throug, with just big enough for it to be meaningful, or just small enough that we can actually get everybody in a room together to make a bold decision to move something forward,

**Professor Corey Bradshaw** 08:55

and kind of like the New Zealand of Australia,

**Dr Ben Heard** 08:58

New Zealand, but but i think but I think we can do more. And there are there are some things, ideas that have been kicking around in biodiversity and conservation in particular that I think we should have enacted a long time ago where we could we could really show some really impressive things to the rest of the world. So I think we've got a lot more we can do, we can do absolutely.

**Clare Peddie** 09:16

What do you think of the job prospects for the future like in this sector, if there are students and I will start with you, Laura.

**Laura Trotta** 09:22

I guess and I get really excited about this, you know, I graduated over 25 years ago, it was from the first environmental engineering engineering course in Australia at RMIT University. So I was in the fourth, the fifth year of graduate. So when I was going into my undergrad, the first grades were coming out and they were all snapped up. And I chose that course over marine biology at the time because I thought there's going to be more job prospects in this and I can work in different aspects of engineering, but have that environmental and sustainability slant. And throughout my entire career, I've never, I've never been out of work. It's always been more opportunities than I can take and it's Continuing to be that way. And it's, and I'm seeing it more and more so for pharmacy graduates or students or that younger generation watching this now thinking I want to get into sustainability, where are the jobs, I can see them really being in three main areas. And this has always been the case, but the opportunities in these three areas continue to increase. So it's obviously the first. So I'll say the area's over the first is planning to do things, right. The second is actually doing things right and managing the environment, right. And the last one is fixing things up when things go wrong. So So under the planning, I see we've got, you know, circular economy space and designing Zero Waste regions and towns, we've got our climate risk assessments and plans, which I do a lot of work in for, for industry, and also the defence sector, we've got setting up sustainability strategies and that ESG so that environmental, social government, governments work in a lot of companies and governments as well, environmental planning and approval, legal. So obviously, car can talk to that environmental impact statement work. So there's so much work in that planning space, and actually looking at new developments, be it industry or towns doing things right. Obviously, the doing things right comes under our traditional environmental monitoring and environmental management, but it also goes into carbon accounting, and decarbonisation looking to transition our current industries into the cleaner industries that we are going to need now and into the future is also Yeah, stakeholder engagement and indigenous relations, you know, you don't need to be a scientist or an engineer to work in sustainability, and environmental management, you could work in the stakeholder and communications aspects, or the legal aspects, or even the finance aspects, sustainable finance. And of course, there's probably what was the first jobs in the environmental sector were in contamination assessment and remediation, which is fixing up things, fixing up land, and groundwater and air and cleaning things up when things go wrong, and those jobs are just not going to go away. And of course, new technologies are coming in the digital technologies, all the renewable technologies and, and switching to cleaner fuels. So so if you're, you know, computer scientists with mathematics, but with a bit of a green slant, there's lots of opportunities with your technology there as well. So I think that I think is a really interesting time and a very exciting time to be heading into sustainability, you can basically pick any stream and any any topics and talents and, you know, follow your passion and create a new job.

**Clare Peddie** 12:36

I'd imagine that be lots of work for lawyers too Kyra, what do you think?

**Kyra Reznikov** 12:40

I think I think there always is going to be work for lawyers. And certainly for me, the area that I work in, which is sort of project approvals and and environmental assessments for sort of major projects, we are seeing projects that are coming into South Australia where we haven't done that kind of thing before, you know, we are bringing new technologies in, I'm looking at, you know, a number of ideas at the moment about bringing hydrogen into South Australia. And obviously, our legal system was written at a time when we hadn't ever contemplated doing something like that, managing plants that are going to look and work that way, putting hydrogen into our pipelines and that sort of thing. So there's always going to be a need to be sort of bringing law up to speed with the way that society's changing, and technology is changing. And then helping sort of the regulators, our stakeholders, our community to understand what it is that we're doing, and how we can do it in an appropriate way, and then make our legal system sort of work around that.

**Dr Ben Heard** 13:45

I agree with and following up from what Laura said, as someone has you did a master's in literally a master's in corporate sustainability. I sort of Now come back and look at that and go, there is no job that itself is the sustainability job. Like there's no hero job out there. That's the sustainability gig. We're all doing it. It's about what companies organisations, universities, government, society, community as a whole. I

**Professor Corey Bradshaw** 14:09

mean, these marches aren't real, no.

**Dr Ben Heard** 14:12

Yeah, that's the, that's the collective effort that we're making means do do whatever you're great at and pursue these goals and values, and you're going to find that great job there. So you know, we, we are, we're a systems engineering and technology company, we are hiring, we do a lot in, for example, really intelligent asset management. And as we need to sort of remake entire systems of poles and wires, and pipelines and assets. And we need to get more out of less all the time. We are using all of our knowledge, all of our intelligence, applying artificial intelligence, machine learning all of the data. There's more data coming than ever before, which is helping us learn more about the systems we built around us to make them last longer, perform better, deliver more to help us get to where we're going. So these opportunities are absolutely out there. So, you know, we as a company, take a very deliberate effort to pursue those real interesting opportunities really in line with our values. And those opportunities are, are across the board. We've got to sort of create those grand societal projects and you'll find very differently qualified people are going to be needed to move these great projects forward. And then we're all working in sustainability which is that's when you know you're winning as the society is when is when we're all working on that on those those those grand goals.

**Laura Trotta** 15:30

Gone are the days when it was just the responsibility of the environmental scientists or environmental advisor in an organisation. So obviously at GHD, we've, you know, engineers from all walks of life, but it's the civil engineer, the structural engineer, the transportation engineer, the mining engineer, the process engineer, they, the building greens building engineer, they all have to be across sustainability in their designs, to, you know, because each each code, every area and sector of society has their own sustainability guidelines that you need to meet as well these days. So

**Dr Ben Heard** 15:59

I'll throw out one big specific area, which is what I'd call mobilising energy. So if we go to net zero being sort of beyond power, and all the way through transportation fuels, all the way through all of the other fuels. So to fundamentally into now, we've been benefiting from hundreds of millions of years of slow chemistry done by the earth for us to make this stuff to about 85% of what we need. And then we just do the last bit, and then we've got our fuel, we're now going to start moving to the point where we're doing all of that chemistry just about in real time to serve that whole economy. It's a massive transformation. So whatever, and I hear you're coming in, I think, right? So chemistry, chemical engineering, and being able to sort of create a mobilise and move energy from root clean energy sources, that he's going to be enormous at needs to be enormous to get to net zero, there's no other way.

**Professor Corey Bradshaw** 16:55

Yeah, so society is a complex adaptive system. And just what basically all of the panellists have been saying, every element of society has to work together, because there is no one lever we can pull, we have to pull them all simultaneously. Now, I often say to my students, you know, and in the biology side of things, or the you know, broader environment, we kind of know, already the major phenomena. What we need now is more behaviour, intervention, society, psychology, we need agricultural, integrate innovation, not just technological but just the planning side of things. Change Management. Yeah, exactly. Democracy, political science, how we can remove the corporate stranglehold on our so called democracies, which, you know, no country can boast having a pure democracy, we all shades of a plutocracy, you know, these are, these are things that people don't actually think about in terms of sustainability. But they're all connected to the system, how we manage our water, which is a massive problem in Australia and all the rorting. With the Murray Darling alone, we see massive problems. And that just cascades through the environment and affects us, especially those post swords at the bottom of the river. And it goes into everything to obviously energy, green chemistry, gearing, engineering, green steel, you know, these are major educational transformations as well, we have to change how we teach people within very specialised disciplines, that they actually are embedded within a complex adaptive system, that every choice that they make, affects the others. And so our education needs to be transformed as well. And we're getting there slowly. But we, I think, because of the need to specialise in our education, because there's so much information to process, that we've lost that interconnectivity and that multidisciplinarity that we need to make these big decisions. Now I'm working with chemists, I'm working with political scientists, I'm working with economists, I'm working with psychologists, the you know, to brace the bigger, what do we do? You can't just pull one lever. And I don't have the expertise to be able to say, Well, you know, this is what you do in psychology. So I have to get my very learned colleagues to help me do that.

**Laura Trotta** 19:05

That's a multidisciplinary approach. team effort. Absolutely.

**Clare Peddie** 19:10

So when you were talking about the road to net zero and there are signposts along the way to tell us whether we were on the right path or things we need to look out for to know Well,

**Dr Ben Heard** 19:22

look, absolutely. I like I like net zero a lot as a term because it takes excuse making away fundamentally I've seen critics of net zero say that this is going to become another excuse for buck-passing and offset. So they're, they're focusing on the net. My experience with the stakeholders or we're working with is actually it's put, it's created a hard focus on the zero. So I'm seeing a lot of large, really powerfully large corporates realising we've got to get more and more processes down to zero, and you can multiply zero as many times as you like, and it's still zero. That's the beauty. That's the beauty of it. So others The signposts are actually pretty simple, the emissions have to be going down, if they're not going down, we're not winning. And offsetting has a very limited future in that, because eventually the whole world needs to do it, and you run out of places, places to hide. So I think I think the major signposts will be electricity just needs to be solved. And we have to stop making an artificially hard. So a clean electricity system is not difficult Australia's making it as difficult as it can, by only choosing some technologies and not all technologies, that part of it has already been amply proven elsewhere. I think we really know we're winning when that he's comprehensively on his way to being solved, based on the evidence we've got of using both nuclear fusion and renewable renewable technologies. When a big shift in the focus goes to, I mentioned that before, displacing oil is going to be much harder than displacing coal from electricity, we're focusing far too much time and effort on the easiest part of the challenge that should just be getting on with and doing, displacing gas is going to be far harder than displacing coal from electricity, because technologically, it's more challenging. It's a more useful, versatile fuel in the world economy than call calling electricity is a very, very directly and easily substituted with uranium and the carbon is gone. You blame the uranium and the renewables and some storage and you optimise the system. It's solved. That's not it's not simple, but it's not a riddle, right. We absolutely know how to do that. There are genius, some things along the way we genuinely don't know how to do. So I will feel heartened when a lot of the effort and focus is switching to those difficulty carbonised sectors industry, steel, cement, thank goodness, we're seeing some of that focus focus emerging now. But we're wasting too much time on the electric sector. Yeah, we need to get into the transport fuels, the industrial processes, and particularly the land use in the land care as well. And construction, construction. Cement sand. Yes, absolutely. That though those materials, that's when I feel like we're winning, it's win a little bit like, I feel like we were at the stage of cutting motor vehicle accidents when we decided to introduce seatbelts, right, whereas now we're way down way down the path of interventions to keep on bringing down motor vehicle fatalities. And it works by the way, it's astonishing how fewer people die on on Australian roads then did when I was born, for example, in terms of the the the level of our intubate interventions, I feel were way back up here trying to deal with the really obvious stuff of your heart. And when we've got that locked in, because we've opened up to all of the technology, we're building all the technology and we need and then we're going after the hard stuff.

**Clare Peddie** 22:44

Any other signposts on that path that you want to?

**Professor Corey Bradshaw** 22:47

Well, very much like emissions, you know, biodiversity measures are all spiralling downwards, there isn't a single biodiversity metric, at least at the scale of, say, the state or nationally that we're doing well, and so we're still losing species faster than then we should be. We're still deforesting, we still don't have legislation that is actually has any teeth to stop illegal clearing, is there's a, you know, in a lot of cases, a landowner, if they are caught, do deforesting or clearing their land. And that's a big if, because often the monitoring isn't there. And if they are fined, the fines are so small that it makes more sense to put cattle on the on the and sort of cut that loss and get the long term profits, we don't have a system with enough legislative bite to to offset that. Now, the other problem is that we have legislation here in South Australia, that can bypass our native vegetation act, if a politician decides that something is a major development, then the native vegetation Council is bypassed entirely, you know, we hope we can fix these little loopholes in the laws quite easily. We also invest less than 1% of our state budget, in anything to do with environment, yet we have these massive environmental problems. Now, unfortunately, we're gonna have to, you know, sequester a much larger proportion of that budget towards all aspects of this, what we call sustainability. So there's some easy fixes. But it just takes a little bit of political bravery. And and now in on the part of the voting public that we need to push for these kinds of legislative changes.

**Clare Peddie** 24:34

Do you have any thoughts about tree loss and legislative change where we are is that not?

**Kyra Reznikov** 24:41

Look, I think it's always and I completely take your point, Cory, I think it's always the difficulty of the balance in the you know, we were talking about the need to make change and the meet the need to be embracing technologies. At the same time, we all recognise that we need to have development we need to be you know, Building mines that are not just going to give us the the steel and the copper, but also are going to give the lithium that we need to make, you know, batteries and smartphones and and all of these new technologies and and control sort of the smart metres that we need to kind of run a grid at net zero. And so the difficulty is always going to be how do you balance opening up land for development and the use that we really need to be able to make these step changes forward with dealing with biodiversity and biodiversity loss and managing sort of the environmental impacts, and that sort of thing. And look, it's it's a tricky thing to do. But I agree that that sort of resources do need to be put into trying to make that balance work.

**Professor Corey Bradshaw** 25:44

And I think a lot of people need to realise too, that, you know, we have, the concept of offsetting is pretty clear, you know, in terms of carbon, what Ben was saying, and we were kind of running out of options, but you know, you you emit some here and you sequester some there, and then you get this, the idea of net zero, we need probably to push more to negative but that's another story. Biodiversity offsets are, are basically modelled off of that where they say, Okay, well, we're going to clear some bushes over here. And then we'll plant some more over here. Unfortunately, most forests in Australia take between 300 and 1000 years to gain the similar function from nothing. So if you were to plant the tree, and even if you could plant all the different diversity of species that you'd need the understory, the major, the major tree species, all the shrubs and everything else and the forbs and everything else on the on the forest floor, you wouldn't get a fully functioning and I'm what I mean by functioning as shelter for everything from the smallest soil invertebrates right up to birds and mammals, as well as carbon sequestration, what it does to the water table hydrology, what it does to oxygen production. So all of these elements we call ecosystem functioning, don't come back. And sometimes never come back. If once you raise a forest, even if you had the best. And we're far from even getting close to the best ways to restore, we don't even have the science behind that yet for most systems, but let's just say you did, you would still have, again, centuries before you get the kind of biodiversity and ecosystem services value that we have today. So biodiversity offsets don't work, no matter how good your system is set up. So we have to get away from this concept that we can build and develop and destroy here. And then just do a bit of planting over here. And she will be right. That's that's a complete fallacy. So instead, yes, we need to continue to restore, yes, we need to do that on a massive scale. But we also have to think about our development and putting into the places that are either previously disturbed and unlikely to come into any sort of natural state in at anytime soon. And, and small amounts, for example, intensification of agriculture as opposed to expansion, the land sparing land sharing agreements,

**Dr Ben Heard** 28:08

and I would point out that's got to be part of the whole netzero picture as well, as much as climate change is probably the main focus I have there is some risk that climate change in zero actually steals a little bit of oxygen from other really important environmental conservation, biodiversity sustainability, quite literally synthesis that are happening on different timescales I mean, you know, if we can get to net zero by 2050 and our energy system that'll be a great effort, but that is, that's a long time to also at the same time be trashing forrest, trashing reefs, doing a lot of other really bad stuff that we want in recovery that are irreversible. Yeah, that are your investment. It's actually as a sort of optimistic futurist, it's probably going to be easier to one day in the future do a technological drawdown of carbon dioxide from the atmosphere than it is to replace this biodiversity so we've got to take more care with that and our road to net zero I think we've got to be us one reason why I'm quite passionate about nuclear technologies because they are dense it is a small footprint so you know we I get very uncomfortable or I see very flippant trade offs of well just because it's creating zero carbon energy every other concern is dismissed we can clear that land to built to build that farm I go Gee, I'm not that comfortable with that trade off. Because we can't get it back that easily. Are we making the best decisions in this direction to to support the values we're trying to protect? I mean, if we're trying to deal with net zero to supposedly support this, this natural world around us It doesn't make sense to destroy it in doing that. So you know, we've got to balance those things out really carefully and really look after the the nature around us as we achieve this. This transitional system. Yeah,

**Professor Corey Bradshaw** 29:47

once species are gone, they're gone. They're gone, despite what some genetics companies might want to tell you about bringing back mammoths. You know, if there's no place to put the species back, even if we could generate bio genetic diversity in a population that's now extinct, which is beyond our technology, and probably always will be. We're not going to solve the biodiversity crisis by creating mammoths. Once it's gone, it's gone.

**Laura Trotta** 30:11

Laura, did you want to know, I do want to add a couple of things. So obviously, that the core message coming out of the panel is that we can't just can't just be focusing on climate, we've got to be tackling all these other things at the same time. But you talked about was it gatepost along the way or signposts along line points. So obviously, we've got out gateposts, you know, the IPCC reports, the science is out there and clear, we have to be net zero by 2050. And we need to be halfway there by 2030. So what less than nine years away, and that's to limit our global warming to one and a half degrees Celsius. Now, there's areas in Australia already that have warm at that amount, if not more, so. And we need to definitely keep it below two degrees Celsius globally, otherwise, we're gonna have catastrophic collapse of ecosystems. So we need to be doing all these things at the same time, but of course, we it's so critical that we limit those emissions to to keep under those thresholds. Otherwise, we will have catastrophic collapse. And I'm all for regeneration. But we have to be mindful that we need to, we don't want to be regenerating land only to hit those temperatures and have so many more bushfires just wiping out that forest at catastrophic temperatures, and, and things like that. So it all needs to be done quickly. Sadly,

**Clare Peddie** 31:32

yes. Well, it may be it's exciting as well.

**Laura Trotta** 31:36

Oh, it's the best time to be in the field at the most challenging and, you know, the problems are there to be solved, and it needs the brightest minds. So there's, there's lots of opportunities. But the urgency is very real.

**Clare Peddie** 31:47

Yeah. Do you think people appreciate what it means to have loss of biodiversity? Is there a Is there a tipping, like,

**Professor Corey Bradshaw** 31:57

now? Well, wow, climate change is at the forefront of even the denialists mind these days. Unfortunately, the press hasn't been quite as focused on biodiversity loss. I mean, some sectors Yes. if most people realise To what extent we are losing species, those couple of quick facts, we're losing species, roughly 1000 times the background right of extinctions that happens between the mass extinction events. The last great mass extinction event was when big bulleid big media hit the what's now Mexico and created this Chicxulub crater and made the non avian dinosaurs go extinct. Of course, we still have dinosaurs, we just call them chickens now, and other birds, right. Massive mass extinction, mass extinctions This is defined as at least 75% loss of species within about 3 million years now 3 million years is a long time. But geologically, it's actually quite a short period. Right now, while we haven't yet lost 75% of species that were here, say back at the onset of the Holocene, about, you know, 12,000 years ago, 15 or 14,000 years ago, we're very much on track to reach that within a couple of centuries, not a couple of million years. So we are in the middle of what we call the Anthropocene, which is the sixth mass extinction event. Now, when your species start declining, and we, you know, we, since the 1970s, we've lost 68% of the number of individual vertebrates in populations around the planet. So that means take any population of any vertebrate when I'm saying invertebrate, I mean, of course, I mean, fish, mammals, reptiles, and birds, amphibians. 70% of the individuals in any given population on average, are now gone. Now. That's the precursor to extinction. So as populations dwindle, they become susceptible, all sorts of random events. So we're seeing this this is across, we're losing insects. Now insects have a very rapid regeneration, right, because, you know, they produce 1000s of eggs per female. And they you know, they develop really quickly, you know, generation length of a bee is three weeks kind of thing. Mosquito can be two weeks, but we're still seeing massive declines in insects, and they make up some of the highest animal biomass on the planet. Right now. That the hot if you take all vertebrates, we'll forget invertebrates for a moment, the highest number of if you take sort of add up all the meat on the planet, if you will, the biggest group is cows. The second biggest group is people. And we've dwindled on native wildlife to such a point where we've just taken all that productivity out of the ground and turn it into cows and people and all of the things that we depend on our food, our air, water, our protection from bushfires is all dwindling. And you got that to the direct effects of climate change, like heat deaths, or floods or massive storms. And you get into a situation where our resilience is just spiralling downwards.

**Dr Ben Heard** 35:16

See, I'm less sure about that. I got Cory, and I sort of have had these debates over a few years in various forms. He's right, over a given time frame. But the irony of the whole rub of that is that since the 1970s, to today 2021, humans have never been in better shape. So at the same time, as all that's happened, humans, on average, live longer, when more literate, were more vaccinated, there are there are more people living in democratic societies, science is going better food security has never been better. We don't see the mass famines anymore, we might see them sweep back in later if all of this gets right out of control. But most people on the planet are doing good, they're doing better than they've been doing before better than they were doing in the 80s, better known in the 70s. So I feel that we all almost always have an affiliation of a charismatic species, blue whales, tigers, you know, quolls the koala Wallah. Right? Absolutely. I'm not sure how attached we'll ever get to the idea that we need the biodiversity around us, because we have over this period, we've been very good at proving maybe we don't, maybe we can liquidate it, and and derive this enormous benefit which we see in the data, I'm more inclined to think we have to want it, we have to want it for its own beauty, its own value in being in the world around us, to me, which is what the Endangered Species Act of the United States was all about. It wasn't that we need that species because it's providing us this vital service. It was we need this species because we need it, because it belongs and if it gets endangered, we will act. So I know cause, right? I know, it happens over a different timeframe, I'm much less certain that it will ever motivate humans, so long as humans actually on the ground are doing pretty well. out of the deal.

**Professor Corey Bradshaw** 37:07

Yeah, but at the same time that you're you're right, that we are living better on longer and that sort of thing, we're running on a bank account that's going into into the red eye, do

**Laura Trotta** 37:16

you have credit cards maxed out that?

**Professor Corey Bradshaw** 37:18

Well, not just that the ecological footprint, we're using, on average, 1.6 Earth's per year, in terms of our renewable capacity. So you know, it's like a bank account, I always use this analogy, you put you put $1,000 in every year, but you need 1500 to live, now you might have a savings of their say, you know, a couple 10 1000s. So you can keep doing that for a while, and you can live high on the hog, but at some point, you're gonna go bankrupt. And we're very close to that point now, if not have passed it in many respects, depending on the metrics for you.

**Dr Ben Heard** 37:51

Yeah. And you know, in the thesis that you helped me, right, and then and I've mentioned this in, in interviews before that, for me as the energy paradox, the energy that's driven our prosperity, and our well being is now driving these comp countervailing risks. How the hell do we do we disentangle these two things, we aren't going to be able to retreat from the energy without creating grave problems for millions of people in the world around us. But we cannot keep using the same amount of energy in the same same way. That's again, for me nuclear fission critical part of that you can, it can break that paradox in partnership with renewables. But this is really a real tight rope that we're going to be walking this century again. So I think you've got to be fiercely optimistic about that. Because attacking that challenge, from from any other point of view is going to be it's going to be hard work.

**Clare Peddie** 38:42

We can say that you're pro nuclear. I wouldn't know. Everyone on the panel, where do you sit with that ideal Where?

**Laura Trotta** 38:52

Well, I'm not anti nuclear. I mean, I worked at a copper uranium mine for four years. Olympic Dam, so as a senior environmental engineer there, I think there is a plate there's definitely a place in our, you know, energy cycle for sure. Of course, every every solution has its pros and cons. And obviously, the big issue around nuclear is the management of waste, be it via tailings or spent spent fuel rods or whatever it might be. So of course, but this company, there's countries in the world that out and have done it successfully for a very long time as well. So I'm definitely not anti nuclear.

**Professor Corey Bradshaw** 39:30

I remember picking grapes in the LA valley of France next to a reactor cooling of talent, thinking Well, the first thing I think of in France is wine and cheese. It certainly isn't nuclear power. But anyway, that I'm absolutely I think honestly without vision when we have no chance of making any of the the caps that we are intending to hit for the future of reductions in emissions and and temperature limitations, but the mix is regionally dependent. I mean, I defer to my experts. colleague here, but I'm in fact I organised the letter by conservation biologists from around the world supporting the fact that without vision and that small footprint with high energy density, we're not going to solve the problems. I mean, if we just look at so called renewable energy of dams, the amount of damage that's done around the planet is unbelievable. It's, if you think what they've done in China, the Three Gorges Dam, or what they're doing in the Amazon, the biodiversity impacts of these kinds of facilities are horrendous. And we could get around that very quickly. Yes, there are disadvantages, but the advantages far outweigh the disadvantages might one of you

**Kyra Reznikov** 40:41

here already, I certainly think it's something that should be explored, it should be fearlessly discussed. And I suppose from my background is, as a lawyer, I know that we've got some laws in place at the moment that are effectively designed to shut down that conversation and stop us from even looking at it. And that really disappoints me, and it was, I suppose, some political, some politics, they got in the way of some smart decision making. I think it's historical. And I think, again, we need some brave souls at parliamentary level, to be letting us have that conversation. And once we've had that conversation, and we've looked in it, and we have brought the community with us, because social licence is obviously a really important thing. And we need the community to know and understand and I think there's some responsibility both within our universities, to have academics who are going to be putting themselves out there and having conversations with the community, and helping the community to understand the science and the risk and the management techniques that we're using. And I think there's also a responsibility for media needs to be normalising these conversations as well. And and using the power of its influence to actually inform and educate and get people to engage on these kind of topics.

**Clare Peddie** 42:01

Can you summarise quickly what the impediments are that are laws that

**Kyra Reznikov** 42:05

work? Well, at the moment, for instance, we've got laws that some that simply say, we cannot build a nuclear generation facility in Australia. We've got South Australian laws that also say that we can't even put money into doing research and sort of assessment and planning for having nuclear facilities. Do

**Laura Trotta** 42:29

you have the three minds policy? Is that still that that

**Kyra Reznikov** 42:32

was never law that Well, that was sort of a political policy. But yeah, I said within political parties and political parties are the ones who I suppose determine what law gets made and what law gets amended, until we've got our politicians who are stepping up and saying, Let's strip away the barriers and let's have a conversation and and make some informed decisions. Rather than simply saying we don't want to talk about it at all. Australia is not ready, I say Australia's ready

**Dr Ben Heard** 42:59

under the EPBC Act.

**Professor Corey Bradshaw** 43:02

The Federal Minister Evironment Protection and Biodiversity Conservation

**Dr Ben Heard** 43:05

Act. Ironically, the Minister has no pathway to approve a nuclear power plant, the specific wording is the minister must not approve one of four actions and their own nuclear actions, and one of them's a nuclear power plant. So what that means is that under the environmental protection and biodiversity conservation legislation, no matter how good the argument is, that you're allowed development would be good for the environment and protection of biodiversity conservation, there is no path to approval. So you could put up the worst power proposal imaginable. And it might not get approved, but the minister could at least think about it could at least consider it a nuclear solution, even one designed in the 21st century for 21st century needs, using all of the new knowledge and technology has no pathway for consideration. So it's an entirely suppressed conversation.

**Professor Corey Bradshaw** 43:56

What are the other acts that it's mentioned in the

**Dr Ben Heard** 43:58

our ARPANS Act, which is the regular regulatory Act, which and it was really picked up out of the ARPANS Act when Australia was creating its new research reactor, which is a terrific reactor? And really the wording was put down again, you could somewhat justified in the options act. What was trying to say is that by creating this regulatory set sector, we aren't by proxy, changing policy on nuclear power. What actually we ended up doing was hard prohibiting it in ironically, our environmental biodiversity conservation legislation. That's a fairly troubling circumstance because it I think, you hit the nail on the head. It just suppresses that conversation. No business case investigation happens in the Australian setting, because it's a losing battle. Yeah. Yeah. So that would be a

**Professor Corey Bradshaw** 44:46

nuclear subs changing event. We're gonna have to service them.

**Dr Ben Heard** 44:52

Well, I think I correct and true statement is that Australia will be establishing more knowledge capabilities skills, skilled people and skilled operators are which will need more training? Yes for which will need more training no matter what. So please take note, yeah, we the distance from where we are to being able to effectively run nuclear power with Australian Australian knowledge shortens, inevitably so that that that's true. But there is still a difference and I genuinely believe they're very different decisions but the commonality in my opinion should be, is it a fit for purpose technology for the challenges we've got in front of us? We've decided that for the means of purpose, pushing very large boats in the water, it absolutely is leaking medical supplies or making medical supplies it is is it is a fit for purpose technology for addressing our environmental challenges, we should have the same conversation the overwhelming evidence is it it is.

**Laura Trotta** 45:51

And obviously some of the green solutions that we're moving strongly forward at the moment, like take up lots of land space, so the wind farms and and solar farms, and obviously we've already spoken about the dams and the impact that they have on rivers and biodiversity.

**Dr Ben Heard** 46:05

Off-shore, renewable energy, so

**Laura Trotta** 46:06

renewable energy, and there's obviously perfect solutions. They're not perfect, they still have that impact.

**Professor Corey Bradshaw** 46:13

Yeah, and being proficient doesn't mean you're anti renewable. That's it's that all all these options need to be on the table

**Laura Trotta** 46:19

saying it needs to be

**Clare Peddie** 46:20

on the table for South Australia, like seems like we've got our like, why not we we don't

**Professor Corey Bradshaw** 46:25

have to know about our missions.

**Dr Ben Heard** 46:31

Well, South Australia was a little bit like Denmark, in that were a small region appended to a much bigger one. South Australia did something very clever, which was move fast and early on renewables. And in so doing, were very effectively allowed to use the remainder of Australia as like a big battery to move energy in and out.

**Professor Corey Bradshaw** 46:51

But what is most of that energy come from the energy that's coming

**Dr Ben Heard** 46:54

back the other way is called is called fire powered. So if the if the if that way of doing energy moves around the East Coast, and is now beginning to that those challenges, grow, you know, what I would say a nonlinear way, they get harder, faster, we go up up a curve of complexity. So you know, the challenge for integrating more renewable energy into South Australia now is we're actually needing to come up with new sources of demand, which I find ironic, we, for generations of sustainability, we've told us less energy efficiency, we're now needing to come up with places to put cheap energy in the middle of the day that doesn't have any anywhere else to go. This is difficult. So there's a place for these energy sources. But the idea that we are going to achieve, as I've said, not only the power, but then all of these other energy solutions,

**Professor Corey Bradshaw** 47:45

like electric cars, I mean, you're just transferring the I mean, if you're charging your car from from from a fossil fuel source, you're just transferring the problem. You're not solving the problem.

**Dr Ben Heard** 47:56

That's terawatts. terawatt hours of new power 50 terawatt hours of new power would conceivably be needed in Australia to charge electric vehicles. If we go very, very hard electric has a lot of new power, even for a new nuclear sector on its own, let alone to try to achieve it without one. So again, it's a question of scale. One way we looked at it with, for example, the hydrogen as a thing, Australia's got heaps of energy security. One thing we don't have a lot of onshore is our own oil. We're an oil importer. We are about 2600 petajoules of oil. In a year, we import into Australia. So maybe if we committed every megawatt hour of all wind, and all solar production in Australia, I don't mean the excess or what's available and cheap hours, I mean, the whole sector, if that was wholly committed to making hydrogen, we'd make about 3% of that energy in the oil from the entire sector, is worth 3% of that oil in hydrogen. So let's say really optimistically, we were able to electrify everything, but 5% of that oil. But for that last thing, for certain purposes, we need some liquid fuels, we would need a whole new renewable sector of Australia larger than what we've got today just to do that job. So again, we got to grab this problem hard and go long term and big. Net Zero is a finish line. It's sort of it's a condition that we've got to meet and then maintain, forever go backwards. Yeah, then forever. It's, yeah, we don't sort of you know, charge over the finish line, you know, pop the champagne and say we want we made it, it's the way we have to operate then forever after. So that's, we need to get all of that technology on the table.

**Laura Trotta** 49:37

And it's not going to be easy. You know, where we're addicted to oil. No, yeah, we're addicted to coal. So the transition is, it's not going to be easy, and there will be some sectors that they want to go back just like when you try and cut out your sugar from your diet, you know, that's hard, and you slip up and you go back so, you know, it's not it's not going to be an easy transition, but we can do it

**Dr Ben Heard** 49:59

and this is there. opportunity that there might be we could, South Australia itself might need only a limited number of these devices in its particular particular mix. But we could manufacture them, we could do a really good job of manufacturing those devices for the rest of Australia and the rest of Southeast Asia. It's a question of where is our opportunity in the whole big picture in the whole world? What's what is our little curious state that can be that right sized state? Sometimes they're getting something done? Is there an opportunity there? I think there is. Yeah,

**Laura Trotta** 50:25

and the big x, big opportunities, also exporting energy to the world, be it in it themselves, or whatever. So we've got the, you know, the landmass for the US dollar, we can get it into battery and be exporting to countries like Japan. That's, that's a big opportunity. So we're already, you know, flowing some of our renewable energy into state. But let's think globally as well. Let's be an exporter. could be it could be our biggest export market.

**Clare Peddie** 50:50

What's the biggest hurdle when it comes to pushing forward and you know, actually achieving some of these broad and big goals, pushing environment and climate change to the top of the agenda?

**Professor Corey Bradshaw** 51:04

Well, I think, here you had it with the social licence. I think that's the biggest impediment well, combined with legislation, which is an expression of social licence, let's face it, but if we don't, if we don't get really sort of broad scale behaviour intervention, and I don't mean manipulation, and that's what the you know, the market is do and that's what the the political strategists do for politicians as they try to manipulate societal behaviour towards their particular outcomes, their desired outcomes, what we need, you know, the UK had a had emphasis on the word had a behaviour intervention committee that was independent from the ruling government that would give advice about how to promote large scale sustainable decisions among the populace the Americans had another one I can't remember exactly the names but they were disbanded and defunded but having these kind of people who understand psychology and behaviour and they can push these out I mean we've done it an individual level with you know, contraception use energy use water use, done it at the societal level, even things like you know, opt in versus opt out options for things everything from energy use to water use, or things like tax compliance in various other components. We can move society towards broad scale acceptance of these logic requirements, but you need to understand the human mind to do that and that's no that's out of my field

**Clare Peddie** 52:38

in yours Laura, which which behavioural change and trying to get people

**Laura Trotta** 52:44

yeah behavioural change for sure. So I am I obviously wear two hats I work in industries senior sustainability consultant with GHD but I also do a lot of outreach work on my own and have my obviously my eco chat podcast where and I saw online sustainability programmes are really try and encourage people to change their behaviours so yes, it is mine at all links back to for people to change they need to want to change but people need to value and it comes back to that valuing our environment and valuing our natural spaces and having that strong connection to to environment as well. And I've often been asked like Laura Why are you so passionate about sustainability environment you know, it's been thing I've been passionate about my entire life and it comes back to my childhood was spent outdoors and I was a girl got a lot of camping a lot of outdoors, I love the natural environment. I lived I grew up in in in gippsland. All around in a town called sail with beautiful wetlands, the the 90 Mile Beach wasn't far away, we were stone's throw from the mountain. So lots of time outside strong connection to nature. And we, I find the people who have that strong connection to nature, value the environment more and then they're more inclined to make the changes to protect it. So I think if we can connect the wider population more to the motor nature, and if it's not getting people out of the cities, bringing the nature into the cities, and I know there's plans for you know, Adelaide to become a National Park City and things like that, actions like that will help

**Professor Corey Bradshaw** 54:20

to develop the greenbelt.

**Laura Trotta** 54:23

So, yes, I think I've got a lot to say on changing our behaviours, but it does come back to we need to value our environment for the value of our environment of just of just valuing nature and not looking at as nature is always something that we need to extract from and something that's product productive. What's a productive productivity value of that area? We need to just value it as just being that area.

**Dr Ben Heard** 54:46

Yeah, I agree with that. I think we sometimes we, we miss having a positive vision that we can all actually understand that we're going towards something good. I think that tends to motivate us slightly more cool. ignited action is we can sort of pull together in the same direction. When we're a bit worried about things we can duck and run and scatter, and we get a little little stressed. So I took to it two or three examples. You know, I've, I live around this sort of, you know, South around the Mitchum kind of area I grew up there, I've left I've come back, but I've watched it now for about 40 years, it's actually greener than it was from street trees. So Adelaide at large is greener, like back in the 80s, God was hot going for a walk to the shops, right? Because there was no shade. And now there is we do have the ability to change the world around us for the better, we have demonstrated amply. So if I can have a vision that, you know, I know, I can go snorkelling off an Adelaide beach, and I'll see all lots of fish. That'd be good. That would be great. Well, what what do we need to do for me to be able to see lots of fish, we've got to clean the waterways, we've got to protect this this habitat, we've got to manage our fisheries in this way. Where's the pull factor towards something positive? Why can't Kangaroo Island be a totally feral eradicated island? That isn't, you know, an exemplar of Australian bush? Where it Where are those visions for what you might see when you when you go out into? So what about clean air? I think that's one reason electric vehicles excite people like,

**Clare Peddie** 56:17

yeah, can't wait.

**Dr Ben Heard** 56:20

Now, yeah, cuz I think we're all quite connected to the fact that those tailpipes suck. There's nothing good

**Professor Corey Bradshaw** 56:26

about, yeah, we have some of the cleanest air in the world.

**Dr Ben Heard** 56:29

I know, I know.

**Laura Trotta** 56:31

That's one of the reasons I live in Adelaide and not Melbourne. And we want

**Dr Ben Heard** 56:33

more than that clean up the walk better, right? It's so weak, we can all ensured that a world without tailpipes will be a better place to live and grow up. And we really grow towards that.

**Laura Trotta** 56:45

And a healthier place. Yes. You know, your asthma and all these other conditions will go down as well. Yeah. So I

**Dr Ben Heard** 56:51

think we need to need to establish ourselves where we're going and why what's in it for us? What's in it for your kids, if we if we embark on these programmes that might that might take this long? Well, everyone has

**Professor Corey Bradshaw** 57:01

skin in the game. And that's the thing is that there's a bit of a fallacy that there's a trade off between environmental improvement, and economic prosperity. And that's, frankly, that's bullshit, that's everyone is going to benefit from even things like reduce population size is going to have fewer, fewer pressures on real estate, it's gonna have fewer pressures on public transport. I mean, these are it's anathema to the economist stuck in the, you know, we must have, we must have economic growth that's measured in GDP, which is basically just the speedometer of economic transactions, we can have a more steady state economy with a stable population, and everyone benefits from improving those environmental conditions.

**Laura Trotta** 57:42

I love that it's having a concept of equilibrium. So why do we Why Why do we always have to be growing? We don't that's just that human greed?

**Professor Corey Bradshaw** 57:50

Well, yes. And that's also, again, some of that corporate stranglehold on our political systems. But, you know, more, more consumers means more profit, exactly. But we don't need them.

**Clare Peddie** 58:02

So how do we maintain hope for the future? Do you still have all

**Laura Trotta** 58:08

hope. I have lots of hope. And I have lots of hope, because I see the younger generations coming through who are educated, and they're passionate, and they're, they're demanding more, they're having that courage to challenge. As I said, like, when I went through uni, that 25 or so years ago, I was one of a small group of graduates, and we weren't a small, like a small number of environmental professionals in Australia that that number has blossomed and bloomed. And it's not just that profession anymore. It's intertwined in every profession, as we've already spoken. So it's becoming a way of life, it will continue to become a way of life, and more and more people are advocating and stepping up to the environment from all generations. So that gives me a lot of hope by it. I no longer have to think, gosh, it all has to be up to me, you know, when I probably would have been that workaholic my entire career, you know, driven by that passion. It's like, Laura, just slow down now, because Jane is gonna do some and Michael's going to run off with it. And, you know, let them do it. So

**Kyra Reznikov** 59:03

and Kyra. Yeah, certainly, I think, for me, it's about celebrating the little wins. And every day, when I have clients coming to me, with these plans for these innovative projects that are just going to be doing really great things for the state for the community for Australia. And we work through processes, and we start seeing them build on, you know, every morning over breakfast when I open the advertiser, and I can see your story about a project or someone who is doing something new and willing to try doing something different, to see if we can do it better. That's what gives me hope that there's so many people out there that are just everyday chipping away. And as long as we keep doing that, there's a life old.

**Clare Peddie** 59:48

All right, I think I'm getting the wind up any quick.

**Dr Ben Heard** 59:54

Yeah, I'll say quickly on that topic. I had a thought bubble on Twitter the other day, which I put out there I got some nice warm responses when I talked about grieve, work, celebrate. We've got to do all of them but never at the same time when we when we start pushing all of those things together we went to any any of them properly and I know grief is a strong word but my friend Corey, he wants told me Javian Rhino forget about it, then, right? It's not gonna happen. That's it's gonna go extinct. Animal Oh, wow. Okay, that's all never see one in the wall, basically, is that what you're telling me? There's a grief in that I think we've got to feel it. But then you've got to work. And you've got to get into a different mindset for your work. And then you got to remember to celebrate, and then maybe you can save the white right? And then maybe it's exactly exactly right. And then you gotta remember to celebrate, you know, if there's a birthday, celebrate it. We if we do all those things, focus on those positives and go there. But that sort of helps me keep, keep that hope.

**Clare Peddie** 1:00:56

Okay. Well, a big thank you to the panel. And thanks to the audience for joining us. And to keep the conversation going. Use the hashtag fearless conversations on Twitter. And we'll have more on this subject in tomorrow's advertiser. And this weekend, Sunday mail. So get out and explore our environment, celebrate dip into the nature festival. We're halfway through in Adelaide in South Australia this week, and have a great day. Thanks. Thank you. Brilliant.

**Laura Trotta** 1:01:24

Thank you.