

**Note: this transcript has been produced verbatim and includes all the quirks and idiosyncrasies of the speakers.**

## **Dallas**

Hello, and welcome to the UK KTN Geo4Earth Podcast Series. I'm Dallas Campbell. I'm a science and technology television presenter.

## **Suzie**

And I'm Suzie Imber, a space physicist. We'll be with you throughout this series talking to some of the finest minds grappling with solutions to climate change.

## **Dallas**

Innovate UK KTN and more than 30 partners around the space and geospatial virtual pavilion for COP26 last year, demonstrated the key role geospatial data and other technologies play in tackling climate issues. Today, we launched the publication meeting net zero with the power of place, which builds on the discussions that took place and highlights the key areas of interaction between the geospatial ecosystem and the climate challenges. The publications are available in two formats. There's a digital version where you can delve into an in depth exploration of geospatial and climate topics, and also a shorter, interactive version featuring case studies and video extracts from the pavilion.

## **Suzie**

This report explores how we need to change our ways of thinking to be more collaborative, inclusive and holistic if we're going to see change happen at the pace needed to deal with these big global challenges. So read the report, listen to this Geo4Earth podcast series and get in touch if you think you can work together with us to deliver positive change.

## **Dallas**

Finally, we just want to thank all of those who over the past year have contributed their time and effort in the creation of the pavilion publication and this podcast. And as Suzie said, do get in touch, we'd love to hear from you. Luca Budello or Andy Bennett at KTN are the points of contact if you want to talk more on any of the topics that we discuss.

## **Suzie**

In this first of eight episodes, we are chatting with Chris Stark, CEO of the Committee on Climate Change and John Remedios, Director of the National Centre for Earth Observation and we discussed the state of play post COP26. We hope you enjoy the show.

## **Dallas**

We have got Chris Stark and we've got John Remedios here with us today to talk about all kinds of things. Maybe you guys could introduce yourselves a little bit, tell us who you are, why you're here and what your vested interests in climate science is perhaps?

## **Chris**

Hi everyone, my name is Chris Stark. I am the Chief Executive of something called the UK Climate Change Committee and we're public body based here in the UK. We were established back in 2008 when the UK created the law called the Climate Change Act, that governs what we're doing on climate change. And the very short summary of what I do, is that we act as a bit like the watchdog of progress on climate change against the targets that Parliament has set in that piece of legislation. The legislation makes it the responsibility of government to hit those targets but we give the advice on the level of the targets. So we give advice on how the UK should respond to climate change itself and then we also give our assessment to Parliament of how well the government is doing against those legal obligations. So it's an absolutely fascinating job, I'm very privileged to do it.

## **Dallas**

That's like the most grown up job ever, not just, not working for government, but you know, holding government to account, well hopefully you'll be able to spill all the beans and tell us what that's like and how all that works. John, you don't have anything to do with government, I'm guessing?

## **John**

No, I do work with government as well, UK and sometimes other governments. So I'm John Remedios. Hello, everyone. I'm director of what's called the National Centre for Earth Observation. But essentially for this purpose, it's a research centre, conducting strategic discovery science, you're trying to work out what the hell's going on in the climate system and we primarily use a lot of data from satellites in space, because it gives us a picture across the whole globe, as well as the UK, so we can see what's changing, here, there, everywhere. Ideally, in a very accurate and rigorous manner, which we then feed into international reports. But we also engage with the UN, United Nations directly on monitoring systematically the climate, we talk to agency space agencies, which are primarily government owned, paid for, resourced, about what the satellites are doing. And then, like Chris, but from a science perspective, we talk to government about what we're seeing, what we're finding and why people should hopefully do something about it.

## **Dallas**

And most importantly, you work with Suzie Imber.

**Suzie**

Yeah, that's true. John and I are colleagues.

**Dallas**

The greatest privilege.

**John**

Indeed, and Suzie and I first worked because Suzie, if I remember correctly, wanted to go up mountains. And one of the things you could tell from space was how high were the mountains.

**Dallas**

Man. That's a whole other podcast.

**Suzie**

Yeah, John, that was great actually.

**John**

It was great fun!

**Suzie**

Yeah, that was that was the best project I've ever done I think John, so I still owe you a beer for that one. But we're gonna talk a lot about observing the climate from space and all the things that we just mentioned, but actually, we sort of wanted to start a bit talking about COP26 because it's fresh in our minds COP26 and we wanted to know a bit about your involvement in COP26. And whether you were sort of satisfied with the outcome at the end of the day? Chris, do you want to go first?

**Chris**

Yeah, well, I have a really close relationship with COP26 because I live in Glasgow, although I work in London, I spent a lot of time on the train up and down to London. And COP26, of course, was in Glasgow, so I have this kind of really close affinity with it. I'm desperate to see it go well, for all sorts of reasons, not least, because I wanted Glasgow to show its best side. And it's quite an interesting, I mean, it's been six months as we're recording this, just about six months since COP26 actually happened in Glasgow. And, to me, at least, it feels like an absolute lifetime ago, because so much has happened in between. But I mean, when I reflect on it, firstly, I think it's remarkable that we managed to have it at all, you might remember, it was delayed a year, thanks to the pandemic.

And it was right in the midst of that, just that brief blip, and we didn't have some sort of lockdown in place and we got away with it. It was, it was brilliant to have it. And it to me, I thought it was a very successful COP but then I think that's because I was very steeped in, you know, the context for it and how difficult it was to have that COP for, you know, all the political and climate reasons, nevermind the pandemic. So I've said this quite a lot. I wish it was the COP we'd had 20 years ago. There's one every year the UN hosts the summit every year. The reason I felt it was such an important COP was because you always have at the core, the scientists you always have at the core, the government's you always have at the core, civil society, you know, people on the streets. This was the COP that business and finance and all the commercial interest finally turned out and lots of people were worried about that at the time, they said it was a sort of greenwashed COP and no doubt that some of that was happening. But they all came, all those commercial interests, all the CEOs, the presidents and the chairs, the big money. They came, I think for the first time because they actually saw some opportunity in all of this. And not just because it was some big trade fair, but because actually they had fundamentally saw a kind of bottom line issue, that they wanted to get over this stuff for the first time. Now in time, that will act as I think as a sort of pincer movement on governments around the world to act more quickly on this and to have greater ambition on it. But of course, that's the issue, isn't it? This is something we don't have, time, it's against the clock. So for me, it is interesting. The reason I say I wish we'd had it 20 years ago, because if we'd had it 20 years ago, if it had that kind of interest in it, then I think we would have we would have been well on the way to cracking it by now. But we've got to get there now, so it's got to happen super quick.

### **Dallas**

It was also the first COP that I think the public really appreciated, that existed. I mean, I think generally, you know, people outside of this world had no idea about COP. They were like, well, I didn't hear about, when was COP25? That passed me by. And actually, it was the first COP having the public kind of opinion on side. And actually, 20 years ago, we weren't really talking about this at all. So, you know, it takes a while, there's all kinds of reasons for that I suppose we could go into but..

### **John**

Yeah, it was the first it was the first COP, it might be the only COP that I've ever been to. So that was a certain excitement in itself, for me personally. I guess, as Chris was saying, you know, you always get scientists there. But for me, as a scientist going for the first time and also communicating to the public from it, so, did some TV and stuff from it. People thought I was a lot more important than I actually was.

### **Chris**

Were you nervous John, giving your talk?

## **John**

No, because it was just some people I knew and some other people who didn't know why they were there. But, you know, seriously I pick up Chris' point about that the business bit.

I mean, I look back at the stories of ozone depletion, which is probably a bit remote for most people. But if you were involved in that science, which I was in the early days of my career, what happened with industry was actually as important as what happened with government. You know, governments can do so much but it's actually what the general ecosystem also does alongside that. So it might be taking following government lead, it might be with incentives, it might be regulation, but they've got to be part of it.

## **Dallas**

Can I just ask you a question on that? Because obviously, what happened with the ozone layer? That was a collaborative thing. It was governments getting together and scientists getting together and business getting together to make a decision to ban CFCs and that's going to solve things. Were there lessons from that, that we can apply to what we're doing now? Given that for sorting out all of climate change, is presumably exponentially more complex than just the ozone layer.

## **John**

Yeah, hugely more complex. But yeah, I think there are a few. I mean, one of the successes I think, was the business already knew what they wanted to do next, how they wanted to develop, but what they wanted was a level playing field if you like, that everyone agreed that we were gonna ban CFCs, and the replacements will be okay for a while, and then the replacements, for the replacements will be even better. And so there was a sort of roadmap, you do this, you can get on. The other thing, there is the international reporting, it probably passes most people by but except when it's controversial, but like for ozone depletion, climate scientists, 1000s of them get involved in criticising for the work, coming to some sort of conclusion, that's very important when people take it seriously. But it does take, I would say, a little bit of political leadership to then put that steamroller approach behind it. People in this country still talk about Margaret Thatcher. You know, some people say she went green, I'm not sure that's true. She was a chemist. So I think this is essentially ozone depletion was a chemistry problem. So she understood it, she got it. And I think you kind of need that with climate change, you need the political leaders to actually have some acumen about this. And so you know, actually, I get this and I want to make a difference.

## **Suzie**

So Chris, I guess this is where you come in, thinking about communication with government, and not just holding them to account, but maybe also communicating and helping everybody understand the sort of severity of the situation and the ways to move forward. Right?

**Dallas**

And the science.

**Suzie**

And the science. Yeah.

**Chris**

Yeah. I mean, I don't claim to be a scientist, I draw on the work principally of, of what's called the IPCC, which is a sort of cleaning house of scientists around the world who do think about climate. And the UN is a really good process, I think, to kind of process the science and come to some sort of consensus position on it, but we use a lot of that. We have two roles in my job, we call our organisation, the CCC because it's such a mouthful so that in the CCC, we have two rules. But basically, we look at how you can cut the emissions that caused climate change here in the UK, it's probably what we're best known for. We were the ones who gave the advice back in 2019, that it was time to set this net zero target that lots of people now have talked about since, it's quite remarkable how many people actually know about that target now, in the few years since we gave that advice. The other bit of our job though, is the bit I don't think does get enough attention, but I think I'm afraid it will in the future, which is the the impacts of climate change itself. You can have a strategy for cutting emissions to net zero at UK level. But the impacts of climate change are impacted by what happens at global level. And the UK is, you know, we will be on the same path as the rest of the world when it comes to climate change itself. And it's on that side of my work that you see the really horrifying stuff, actually, you can really understand, kind of lift the bonnet, I suppose on the kind of impacts that we'll see, even in places like the UK, which is relatively insulated from some of the very worst impacts of climate change, even in a place like the UK is pretty horrific what's coming down the pipe if we don't do something about this issue of emissions. And it's really important that net zero is this kind of term that's bandied around now as kind of a, almost a slogan. But actually, it's a scientific goal. So when you get to net zero carbon dioxide, that's the point when we basically we take out of the atmosphere, as much carbon as we put up. And it's that point that you start warming the global atmosphere, and until you reach that you keep warming it every year and it's quite an extent of inevitability, which is what keeps me interested in this job mainly,

**Dallas**

That's really interesting. John, you're gonna come in now, you've got your hand up, maybe just explain what net zero actually means. I mean, Chris, you've just sort of alluded to it there. But it's a term that I think people get confused about. John, have you got a nice way of explaining it?

## **John**

Yeah, well, it's a balance, it's a balance thing. So it's, if you put stuff in, you need to take some other stuff out. So you know, add five bits of carbon on, you need to take five bits of carbon out. So the net result is zero.

## **Dallas**

So it's not just turning off the tap?

## **John**

It's turning off the tap, but also taking stuff out. So the big one that people, some people think about, a lot of people care about, actually even more than know about it, are forests. So if you grow forests, in theory, if you grow them right, and you have them long standing, that soaks up some carbon dioxide out of the atmosphere. Carbon itself is good, people sometimes get this the wrong way round. Carbon is a great thing to have around, it's you know, it's the whole basis of life. It's if it's in the wrong place, that's the problem. So it's when it's in the atmosphere in huge quantities, it's in the wrong place. We still want some of it in the atmosphere, otherwise the whole world would also be a very terrible place to live. But we do need some of it locked up in the land and in the ocean. So forest is a great example where a lot of people care about forests and sustainable landscapes, you know, so what do you do with the fields? What do you do? And it's something that you can all relate to actually because it's your local life even in the UK, it's not very far from any rural location. So it's how do you take care of that and help to absorb carbon from it. So that's the net bit of it, you know, getting a sort of zero balance in terms of what we're putting in. But I also wanted to return to Chris' point about the impacts. I mean, I think one of the things that I do find doesn't go as well is that people make pledges around mitigation and reducing, but I don't see as much urgency in reality about planning and not doing things that put you in harm's way. So if you think about floods, or you think about, I think a lot of them these days, and I think Chris's committee's looked a bit at this, urban heat stress in cities, and how many people suffer from heat stress and, you know, excess deaths, etc, that you get and I still find the sort of whole response rather lukewarm, you know, we still build houses on floodplains, even though we think under climate change, you know, the floods will get worse. We still, you know, pack people into houses, in deprived areas and cities, even though we know, that's where they get really stressed from heat and pollution and have a poor life for all sorts of reasons. And that I find, you know, I find work quite slow on. I don't know if Chris would agree.

## **Chris**

I really, really agree. I think one of the reasons is that the kind of the trade, the signs that you're talking about is called adaptation, which is a word that no one really wants to utter, because it's such a kind of mouthful. But the kind of adaptation to the changes in the climate is absolutely essential. And even, you know, we might talk a bit about how you get to net zero in the UK. But there's lots of things that you need to do and it's bit more than just growing forests, of course, John will know.

But actually, you've got to adapt to the warming climate as you do all these things. So trees are a really good example of that, if you plant a tree in an area that in the future, you know, will have a drought it's not a very sensible strategy for taking carbon out of the atmosphere. And yet, that's what we are doing right now. So you know, there's a collective lack of preparation for absolutely inevitable impacts of climate change and never mind the really extreme impacts that we'll have if we don't act on all of this, which is very troubling.

### **Suzie**

One of the sort of themes that we follow throughout this podcast series is using geospatial data. So I guess my question for you John, is using earth observation, geospatial data, how do we use this to monitor both our changing climate, but also try and think about ways that we can sort of adapt as Chris was mentioning?

### **John**

Yeah, so we do quite a lot of things. I won't bore you with all them. But what I think is really important and it's quite interesting, it's almost become part of the infrastructure we used to do this, you know, these satellites that are whizzing around in space. There are lots of them, but they each perform really quite often unique functions, we absolutely need to have them. It's really quite difficult work. I mean, often the changes you're looking for in some of these things are actually quite difficult to measure robustly. But what we are gradually working to do is two things I think, one is what's called the Global Stocktake. So this is kind of how do we really see whether we're making a difference? So we've got all these pledges, we're going to try and reduce methane, we're going to try and improve the forests, we're going to try and cut our transport and our carbon. Can we see that? And to do that you need to look globally? So can we see the change in carbon dioxide in the atmosphere? Can we see the change in methane in the atmosphere? And can we match it up with what people say they've done? does it actually work? Then we can look at, you know, as the world evolves? Are we seeing more heat waves, floods? Are you seeing coastal erosion? And at what rate and magnitude? One of the frightening things in terms of looking at change has definitely been something that UK scientists have looked at really intensely, which is ice change, led to films, Day After Tomorrow, and all these things, you know, the disaster movies. But it really does strike me as huge changes, you know, you're almost seeing an entire part of the planet changing the form of water that is it, you know, it's no longer quite as cold and snow bound as it was. There's open water, you know, and all the consequences of that. So you really see that picture. When you look at the satellite year on year, it becomes inexorable in some respects.

### **Suzie**

And the satellites that you're using, are they government funded satellites? Space agency funded? Are they private satellites? How do you get the data that you need, a mixture of the two?



## **John**

Yeah, really interesting, primarily public funded up till now, but quite a lot of companies are and there's a bit of a move in the states to do this, to say, let's get companies flying satellites and let's see how that data can be used. Usually, at the moment, those sort of satellites are best for specific things. So for example, the satellite moment, which measured methane and and what it's doing is chasing up methane leaks from oil and gas rigs, it's looking at big areas of fracking, stuff again, kind of depressing sometimes when you look at it and look at how much is going on. Again, there are other satellites, that are gonna look at cities and how cities are changing. Many of these satellites are actually offering you solutions across problems. But there's definitely an increasing commercial industry that's doing that. And that tells you, back to Chris' point, that actually they believe there's a whole bunch of people out there who want to use that information in the business world. So it could be for carbon credits, it could be for, for planning, it could be for agriculture, all sorts of things. So it's really important.

## **Dallas**

It's really amazing. I mean, satellites are our eyes, and ears and noses of our planet. And all of our data increasingly comes from satellite observation, I would just want to just move slightly away, I just want to ask Chris, a question, which is about the inner workings of government. I really want to know what that's like and how easy that is, and what the process is, you get all this information from people like John and Suzie, how do you begin that process of talking to government to get them to make decisions?

## **Chris**

Well, it's..

## **Dallas**

You wake up in the morning..

## **Chris**

I wake up in the morning, I read what John has sent me, I forward it on to a willing minister and bish-bash-bosh. I wish it was like that, it's not like that at all. I mean, I think the UK is I think, better at this than most other countries in the world, certainly most large developed economies.

## **Dallas**

Is it frictionless?

## **Chris**

It's certainly not frictionless. No. And I also feel it shouldn't be. I mean, it's important to say that. I mean, without going too deeply into it, the kind of changes that lie ahead, if you take something like this net zero target that we've talked about a few times,

it is pretty fundamental what you need to do to the UK economy to reach it. If you think about all the ways in which we use fossil fuels at the moment, you know, the fuel that you put in your car, for example, the plane ride you might take, the way you keep yourself warm in your home, all the products that you use, without thinking about it have fossil fuels behind them as well. It is a kind of fundamental of life at the moment that we use fossil fuels as extensively as we do and we use all sorts, we do all sorts of other things like pretty destructive agricultural practices around the world too. Fundamentally part of the kind of modern way of living, if you want to change that, I can talk to you for hours about the ways in which you can do it but it's a giant project. I mentioned earlier, we're against the clock, which is what makes it so interesting. There's lots of good reasons to think that we're on the right path to fixing some of this but the big challenge actually is to do it on time, to do it quickly, which is this kind of vast, you know, society wide challenge that we face. So it's not frictionless. And the way that works in the UK, I think, better than other countries because we have this platform in the Climate Change Act that creates this idea that you have to do something over the long term. Without getting too geeky about it, what's clever about the Climate Change Act, it was passed in 2008, it was a particular moment in British politics, where you had David Cameron's Conservative government kind of warming up to come into government, they wanted their way of demonstrating their progressive credentials, so they fully supported this new climate change legislation. And you've got this cross party consensus on an issue that you don't get consensus when you go to somewhere like the US, for example, it doesn't exist. So that's really helped. But what's also helped is this kind of progressive idea that behind this, is an economy challenge and actually, that every day we look at this topic, it gets more and more appealing to make the move towards zero carbon. So today, it is, you know, by some distance, the cheapest form of electricity generation is renewable. So if you can build a whole energy system around that, it's actually a cheaper energy system, which means everyone benefits from it. So if you get to the point where you can do that, then every electrical device that you use will also benefit from having cheaper energy and will also happen to be decarbonise. So you know, that story, we've been part of the job of telling that story consistently over the last, you know, 12/13/14 years. That's what keeps government interested. But the crucial bit to kind of answer your question is that you've got to keep refreshing it, because politics is about mutual consent, but the economy waives social consent for these changes. And it's quite right, that the science says you must do something by this date. But it's equally right that politics determines the way in which that's achieved, of course, influenced by the things we've just talked about. So for me, that's what makes my job so interesting is you're working with the fundamentals of the science, of course, but you're also working with the fundamentals of politics and consent and you've got to bring that together. We do all the numbers. We have a great time providing this analysis, but numbers alone, don't get you to the big changes that we need to see across the country.

Now presumably you've got to keep it at the top of the political agenda, because political agendas are changing all the time and whoever's in government has a whole raft of different problems. So the challenges of keeping it up the top and keeping it in the public consciousness, are governments sort of receptive to that?

I mean, I think they're always, gosh we're in the midst of a Ukrainian crisis and a war. I mean, I think it's quite right that it doesn't sit right at the top all the time.

### **Dallas**

But in a way this kind of stats actually kind of segwayed into our problem, the fact that we now say, well, actually, here's an, okay it's a terrible war but can we use this as an opportunity to finally say, we're not going to rely on Russian oil, which may eventually say, Okay, we're not going to rely on any oil and gas. Have you been part of that process?

### **Chris**

Definitely we have been meddling, one of the great advantages of having that framework that I talked about in the Climate Change Act is that you're required to think kind of 2030 years hence, people sometimes say that we do forecasts in my job. We don't do forecasts, what we effectively do is we stand in the future and look back. So we try and work out the quickest route to getting to the goal and that is far more interesting actually, to do that. But when you do that, you see that there are lots of really important and sensible things that you need to do now, to get yourself ready for that goal in the middle of the century. And they're big and difficult and involve lots of infrastructure investment but crucially, they also take you off fossil fuels and they make it actually far more secure, energy security has become more and more of a theme. I think we've understated the benefits of decarbonising when it comes to energy security. So you couple that, which I think is, you know, very live at the moment, with the other thing that's happening and this is, I suppose, more debatable, but for me, I don't really think there's any question of it now, which is that people are feeling the change that's happening in the climate now. They're seeing things happen. It's happening at a scale, that's just about a kind of lifetime scale now. I mean, I'm in my early 40s and the summers that I was experiencing when I was born are very different to the kind of summers that we have now and that is just about enough, people see the kind of regular wildfires that are happening around the world, they see droughts, they see flooding events here in this country and crucially, they are now connecting that with the underlying cause, which is these greenhouse gas emissions that we've talked about. And that is pretty potent actually, when you bring in the fact that these alternatives to using fossil fuels are now more and more appealing each year. So there's quite a potent mix to make these big changes and politicians see that, some of them would rather we didn't do it, there's no doubt there will always be politicians who feel that way about it. But most of them are on board, I would say. And again, I sometimes pinch myself because other countries don't have that, you know, that circumstance and we're lucky to have that I think.

### **John**

People are so important in this game. I mean, it's voters, you know, it's what the country thinks. And I think, you know, I'm very encouraged by the UK in that sense. I mean, the way in which people in general think about this problem, it's a really nice environment in which to work. Those things that go on, like the Ukrainian war, etc, etc, they serve to remind us don't they actually of the international dimension, you know,

every time we want to be within our country and just thinking about ourselves, these things happen more broadly and so well actually we can't escape the fact that things go on somewhere else and one of the biggest things that I know people have been talking about recently is, how does climate change affect your food? And your food supply? Not just the sort of oil and gas. And again, Ukraine reminds us of that don't they? After oil and gas, agriculture, wheat, you know, you can see the change in price in your supermarket if you buy those products, you know, it's already there. So I think that really reminds us, the thing that I find more difficult with governments, and we do focus a lot on UK Government, and it does, I think do a really good job, both for ourselves, but across the world. But I think it's also how you really convince people and leaders elsewhere as well, that's really crucial. They have quite different cultural mindsets. We see this a lot in our work. They're not necessarily wrong. They're, as Chris says, they have their own views, their own ways and their own problems that they're also trying to solve. But it's absolutely a huge part of the task. So I think that's the bit that's still really, you know, remains messy politics.

## **Dallas**

Both of you sound quite optimistic, actually. Is optimistic the right word? But you sound positive about our British contribution towards the politics of climate change. It sounds like we're doing an okay job.

## **Chris**

I mean, I'm positive to a better contribution, but I'm also realistic about the fact that we have a hell of a lot of responsibility for the problem itself. So again, we sometimes refer to this as a accumulative problem, once you put a particle of carbon dioxide into the atmosphere, it's quite, it doesn't come down very readily unless you grow a tree. You know, it's up there and it has this cumulative effect, which grows each year, as a sort of blanket, as it's sometimes called around the earth. We have a huge responsibility, even, you know, in the raw numbers, actually, from the amount of particularly the coal that we burned since the start of the Industrial Revolution, nevermind the fact that we then exported that model of an economy around the world, sort of modern economy is very much based on the UK example. So there's a lot of responsibility to address it. But I think where we are now, there is a lot that the UK has been doing of late that is worth celebrating, but it's still not fast enough. So I mean, my job is to point that out. But you could think of something like that the transition towards offshore wind, as a really good example, with a technology that even just a few years ago, many people, particularly those who who'd rather not see us move more quickly on climate, many people complained about the price of it, the cost of it. Now, it's amongst the cheapest, if not the cheapest forms of electricity generation in this country. That's a huge step that we've taken as a country. But of course, it's also a huge step for every other country around the world now, who wants to use offshore wind. So we've done actually a very good service, in bringing the cost of that technology down for other countries around the world. I would like to see us do more in other areas in similar ways though, so we need to make lots of bold steps. And there's still a lot that the UK can do to genuinely lead if we want to proclaim ourselves, as we often do as Climate Leaders, then we're gonna have to go beyond that story on the energy sector into all the other

challenges that we face. And it's in those areas that you see less progress in the UK, sadly.

### **Suzie**

You talk a bit about our responsibility, and rightly so. But I guess the other aspect is that the impact of climate change is often felt more by countries that maybe haven't contributed as much to the situation that we find ourselves in. So, I suppose thinking about kind of the role of international collaboration, somehow, we not only have a responsibility to think about what we've done and try to support this net zero target, but also thinking about how we work with others who are directly impacted, how do we build those collaborations and support those communities?

### **John**

Well, that's one of the reasons for my optimism, because at some level that happens already, you know, you want to see more of it, there's that urgency factor but I do feel optimistic, I feel optimistic because of the energy mix change that Chris was talking about. But if you look internationally, you also see that [unintelligible] giving some talks to the public recently. And I went back and looked at some of the results of the Global Carbon Project and look at how emissions have changed. Even in China, you see that actually, it was a big steep rise but it's tailed off in recent decades, now they might be taking off a little bit, again, because of circumstances but there's clearly something that's happened there. And clearly, that's partly politics, that's partly economy and technology. But it's also partly scientists collaborating between these different countries. Just to give you a different example, not a lot of people know this, we published a paper with Chinese colleagues, I say we, it's actually colleagues from Edinburgh and what it did was look at the areas of forest that China have planted, I think they're probably quite regimented about this and that may be a good or bad thing. But they have planted a huge amount of forest. Now, if you look at that, that's actually made a difference to this net zero, if you like, in that area and if you couple this with the reduction that they've tried to do, for whatever reason, in carbon and from coal plants from oil and gas, then you actually see that they're making an effort and that's come about because of this international collaborative efforts, you know, the Edinburgh people working with the Chinese people to say, can we do this? etc, etc. So I think there are some grounds. The key thing though is, I think, also is we need to recognise commitments, you know, so like you say that there are people who are going to suffer from this because they're in vulnerable parts of the world, or because they haven't had the industrial growth we have. And somehow, we still need to get this idea that it might be better for us in the long term, it might actually cost us less to help them move in a different direction, than it would cost us if we did nothing, it would cost us more, money terms, everything terms. Still a bit tricky, I think that.

### **Dallas**

It seems that the days of just let's just sweep the problem under the carpet are well and truly over in terms of collaboration. Actually not doing anything, is going to become increasingly more expensive and less attractive than doing things, that seems to be the the message I'm getting.

**John**

Yeah, I think the world could potentially change quite a bit. You know, I think we're always changing aren't we, the human race in the last 100 years.

**Dallas**

We're bad at changing though, we're bad. You need incentives and you've outlined a lot of what those incentives are, particularly financially and then collaboration obviously, that's going to be a key thing. I'm slightly conscious of time. A bit like climate change, we're up against the clock, slightly less important clock, for our podcast. I tell you what I'd like to do just talking about optimism and where you stand on this. If you had a magic wand and you could do one thing to move us along this path and help solve the multitude of problems. I'm just wondering, from where you're sitting, what your magic wand would do, John?

**John**

Yeah, I guess, we collaborate enormously across the world. But I would like to see, as you know, that role even stronger the connectivity between the science and the politics at the global level, it's there and I'd like to see it make a real difference on the carbon input question, because I agree with everything Chris has said about adaptation and I'll come to that in a second. But what we really have to do, is get to net zero or something approaching net zero. And that means that the governments across the world have to say, well, yes, this is in our interest, tell us exactly where we're at and where we need to go to and people are doing that. But we just need to go one big step further. I see this, and I would say this wouldn't I? But I do see this space data as being a really important part of this, because we can really see what the net change is globally and we can say, it's not big enough, it is big enough, you know, here is where it's making a difference, here is where it isn't. But we need to learn to do that in a systematic approach, straight to almost the top table of politics. We're not quite there yet, we're there in predicting the bad future but we're not quite there on what's happening now, actually being able to say perhaps you're doing a good job, some of the time. I think where the biggest thing, that where it does come back into adaptation is I think, it touches on this really big change to urban living. So across the world, people are migrating to cities and into sometimes very dense cities and I think what we do about that, and how we deal with that problem, and there are some good sides of this by the way, if you change transport systems, you have effective transport, you can make a big dent. But we haven't really taken a holistic look at that and yet, it's one of the biggest things that's happening, that affects everybody. So I would love to see us take that seriously and make a big, big dent in that problem for the better.

**Dallas**

Chris, it's all on your shoulders, getting all this information to governments.

**Chris**

Well, I mean, there's something in that, isn't there? Because it's a really good question. What would you do if you had a magic wand? If you had a magic wand, you would of course, fix the problem with yourself.

**Dallas**

It's not that good a magic wand, it's a bit of a rubbish magic wand.

**Chris**

So I'm assuming it's limited magic we've got?

**Dallas**

Yes, exactly.

**Chris**

But it's interesting, even if you did, I suspect we wouldn't have solved the problem, you might kind of fix it today and then we'd still carry on, which is really at the heart of the problem as well, we carry on doing the same things. So that magic wand would be, I'm just going to focus on this net zero challenge, since John has spoken so well of adaptation. The net zero thing, the one thing I would want to do, is to encourage people, firstly, to believe that we'll do it, which I do think is a really, really important aspect of it, not to view it as some impossible challenge. It really isn't, it's a very, very possible challenge but then secondly, to see the benefit of doing so. So I think that we're very much further down the road in this country than in other countries in thinking that way about it, it's now, I agree with what you said earlier, it's a fundamental that's kind of accepted now, we're gonna get there, I think is something you'll hear people speak about, the key thing is we've got to do it quickly and we've got to believe that that's possible. Well, I would like us to be able to do that and now this is comes back to, this is less of a magic wand and more of a sort of pragmatic outlook on it, that's what the UK now needs to do, I think if it wants to carry on being a leader on this, it needs to demonstrate that a country like the UK can achieve net zero, because actually, of course, we're not a huge contributor to the problem in terms of raw emissions each year any longer. We're still significant, incidentally but that's not the issue anymore. The issue is in demonstrating that a modern society and economy can do it and indeed, we'll see the benefits of doing so. So if I had this magic wand, that outlook is what I would encourage everyone to have and then things start to make sense. You start to think differently about how you heat homes, how you travel, how we generate electricity, what you do with farming, those sorts of things make sense, where you know that you're trying to head to that destination and you also know that it's going to be positive for the economy, for society and for people.

**Dallas**

Okay, that's it for this episode. I really hope you enjoyed the discussion. Thank you very much to John and Chris, for taking part. Thank you for listening and we look forward to your company next time.

**Suzie**

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