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## **THE REITH LECTURES 2020: HOW WE GET WHAT WE VALUE**

**Reith Lecturer: Dr. Mark Carney, former Governor of the Bank of England**

### **Lecture 4: From Climate Crisis to Real Prosperity**

**TX: 23.12.2020 at 9am, BBC Radio 4**

**Anita Anand:** Welcome to the 4<sup>th</sup> and final BBC Reith Lecture for 2020, with Dr Mark Carney. Dr Carney is one of the world's top economists, working around the globe in some of the most important financial institutions. Until recently, he served as Governor of the Bank of England, a role he previously carried out in his native Canada. Over the course of this series, he's argued that we need to re-prioritise, we've been subjugating our own human values in deference to money and finance. Perhaps a surprising message from one who has been, after all, one of the most influential bankers in the world. "Our collective failure", he says, "has led us into a series of crises."

Now Mark Carney turns his attention to perhaps the biggest crisis of all, that of climate change. He's going to argue that the roots of our environmental emergency dig deep into that same crisis of values. Now Mark's promised to signpost a route to a better place and there are certainly few people who know the topography as well as he does. He currently serves as the UN Secretary-General Special Envoy for Climate Finance and also as the finance advisor to the Prime Minister, Boris Johnson, where he prepares for the next crucial climate change conference in Glasgow next year. This lecture is entitled *From Climate Crisis to Real Prosperity*.

Please welcome the BBC's 2020 Reith Lecturer, Dr Mark Carney.

[Virtual audience applauding].

**Dr Carney:** Thank you... Thank you very much indeed, thank you all for joining this, it's a great honour. Now, these lectures, these four Reith Lectures, began in the Glasgow of Adam Smith. It was a time of the rise of the invisible hand, the dawn of the Industrial Revolution, and the beginning of the eclipse of moral sentiments. And they conclude this evening with the Glasgow of COP 26, where in one year's time, countries, companies and communities will try to launch the sustainable revolution, to put the market into service of humanity, and once again have society's values drive value.

The human race has thrived during an 11,000 year era of extraordinary climate stability, known as the Holocene. Now that stability is shattering. We've created a new era, the Anthropocene, in which our earth's climate is driven not by the geological rhythms of nature, but by the frenzied activity of humans. As the Industrial Revolution spread, the earth's climate began to change. Since the publication of Smith's Wealth of Nations, carbon dioxide in the atmosphere has risen to its highest levels in over 800,000 years. Our planet's average temperature is already 1 degree Celsius warmer. In fact, the last five years have been the warmest on record.

The impacts on our planet's finely tuned ecosystems are intensified. Our oceans have become 30 percent more acidic since the Industrial Revolution. Sea levels have risen 20 centimetres over the past century, with the rate of increase doubling in the past two decades. The pace of ice loss in the Arctic and Antarctic has tripled over the last decade. Extreme climate events, hurricanes, wildfires, and flash flooding are multiplying. What had been Biblical is becoming commonplace.

These effects began to eliminate individual species and are now destroying entire habitats. Scientists estimate that there have been five mass extinctions in the history of our planet. And human activity is now driving the sixth, with extinction rates 100 times the average, over the past several million years. Over my lifetime, the population of mammals, birds, fish, reptiles and amphibians is estimated to have fallen by 70 percent. Perhaps because they were not formally, financially valued, these losses were initially downplayed, and their cause was treated as an issue for another day. But now the effects of climate change are beginning to affect assets, which have a market price, making the scale of the looming calamity more tangible.

And now with the COVID crisis exposing the tragic folly of undervaluing resilience, and ignoring systematic risk, society is beginning to place greater value on sustainability, and that's a pre-condition to solving the climate crisis.

To understand what needs to be done, we must first understand the causes of the climate crisis. Scientists have concluded that the pace of global warming is roughly proportional to the amount of carbon dioxide in the atmosphere. And that means we have a carbon budget, the remaining amount of carbon dioxide and other gases that can still be released before our climate becomes even more volatile and destructive. To stabilise temperature rises at any level, we must reach net zero, where the amount of carbon emitted and the amount taken out of the atmosphere, are equal. So it's important to recognise that net zero isn't a slogan, it's an imperative of climate physics.

Exactly five years ago in Paris, governments agreed to try to get on a path to stabilise temperatures at 1 and a half degrees centigrade, or temperature increases at 1 and a half degrees centigrade. After five years of uneven progress since then, emissions now need to fall by at least 8 percent every year over the next two decades. If we succeed, the "average" global citizen born today will have a personal carbon budget over their lifetime, equivalent to one eighth of their grandparents. Think of that next time you hear, "Okay, boomer."

Thus far, efforts to address climate change have struggled between urgency and complacency. The urgency of carbon budgets that could be consumed within a decade and the complacency of continuing to add new committed carbon in our new cars, homes, machines and power plants. The urgency of the looming sixth mass extinction, the complacency of not valuing the loss of individual species and the destruction of entire habitats. The urgency to reorient the financial system for the massive investment needed to create a sustainable economy, yet the complacency of many in finance, not knowing their own carbon budgets were having plans to achieve net zero. These tensions reflect the common challenges of value that we've seen in previous lectures, namely human frailties, market failures, and the flattening of values.

Human frailties create a tragedy of the horizon. That means the catastrophic impacts of climate change will fall largely on future generations. The current generation with our horizon fixated on the current

news, business and political cycles, has few direct incentives to solve the issue, even though the sooner we act, the less costly it will be; for an issue that can only be solved in the present, we have to value the future.

Market failures create the tragedy of the commons, and this arises when individuals acting in their own self-interest, undermine the common good by depleting a shared resource. Examples include the deprivation of common grazing lands in 19<sup>th</sup> century England, the decimation of the Grand Banks Fishery off Canada in the early 1990s, 1980s and 90s, and the ongoing deforestation of the Amazon.

And there are two solutions to the tragedy of the commons: property rights and pollution pricing. The first is impossible on a global scale, unless we're willing to enclose the whole world to a few private landlords. The second is essential, but so far carbon prices, that is, taxes on carbon emissions, have been applied only sparingly, and they're set far too low, averaging \$3 per tonne globally. And that's well short of the estimation \$75 level needed by the end of this decade, to get us on track towards net zero.

And while it's effective to assign a monetary value to a scarce resource, you might well ask, "Why does someone have to be paid not to be a jerk?" Companies knowingly on the path inconsistent with net zero have echoes of tech companies, paying all the taxes due, while using complex offshore tax shelters to avoid there being any tax due at all. And this points to the third issue, the flattening of values. We've been trading off the planet against profit, living for today and leaving it to others to pay tomorrow.

Now there is a way out. The Nobel economist, Elinor Ostrom, has documented how a community can cooperate to manage a scarce resource. And this is exactly what next year's Glasgow summit is about. It's about bringing companies, communities and countries together to manage our global ecosystem by developing a consensus for sustainability, we can unleash the dynamism of the private sector to put value in service of values. If society sets a clear goal, it will become profitable to be part of the solution, and costly to remain part of the problem. If, as it is beginning to appear, society's values are being redefined, prioritising resilience, solidarity and sustainability, the tensions between urgency and complacency can be resolved.

Commitment can replace complacency, urgency can become opportunity. Because of the challenge of shifting our economies to net zero is an enormous opportunity, and it's one that will have to involve every company in every sector in every country. Building a sustainable future will be capital-intensive after a long period when there's been too little investment. It will be job-heavy when unemployment is soaring. It will be global when we're being pulled to the local. It's what the world needs for its future and it's what we need right now.

To seize this opportunity and solve the climate crisis, we must address three challenges, engineering, political, and financial. And I'd suggest that all are within our grasp. With time scale and massive investment, we can green power generation buildings and most forms of transport and much of industry. We need to electrify everything and turn electricity generation green. Existing technologies, when applied at scale, can economically reduce about 60 percent of emissions, keeping the world on track to net zero consistent with 1 and a half degrees warming. However, we don't yet have commercial technology to cut around 25 percent of man-made greenhouse gas emissions. We need greater investment and innovation in critical technologies, such as hydrogen, carbon capture and storage, and sustainable aviation fuels.

Now to some, calling for further technological breakthroughs is a council of despair. To others, the innovators and the entrepreneurs, these challenges disguise enormous opportunities. In all cases, speed and scale will be critical, and that's why people like Bill Gates and Bill Gates is leading a multibillion-dollar breakthrough energy fund, to help drive these technologies to competitive scale, in short order. Now, the more credible our government commitment's to net zero, the more investors will

pour money in, in anticipation, and the more a virtuous circle of large scale and greater efficiency will operate, but that leads directly to the second challenge, which is politics.

We need a strong consensus to break the tragedies of the horizon and the commons. So far, over 126 countries *have* set net zero targets, and subnational governments are making pledges and enacting plans. And there are a variety of industry groups and financial institutions that are beginning to commit to do their part. Momentum's building, but the reality is even more is required. And so a little over a year ago, I sat in the UN General Assembly with Presidents, Prime Ministers, business leaders and other dignitaries, people like me who are there because they were committed to addressing climate change, committed to creating higher paying jobs and sustainable jobs, in all of our countries.

I'll be honest, we'd entered the room feeling pretty good ourselves, we, we weren't the deniers, we were armed with pragmatic solutions to what we knew was the world's biggest challenge. And then the following words cut through. And I quote,

*"You've stolen my dreams and my childhood with your empty words and yet I am one of the lucky ones, people are suffering, people are dying, entire ecosystems are collapsing, we are in the beginning of a mass extinction and all you can talk about is money and fairy tales of eternal economic growth. How dare you. We will not let you get away with this, right here, right now, is where we draw the line. The world's waking up and change is coming whether you like it or not."*

There. With the clarity and certainty of youth, Greta Thunberg was telling us that we were failing. Social movements like *Fridays for Futures*, which she started, give hope that society won't settle for worthy statements followed by futile gestures. It won't settle for countries announcing plans in Paris five years ago for 2.8 degrees warming, far too high, that they don't even meet. Society won't settle for companies that preach green but don't manage their carbon footprints, or financial institutions who can't tell us whether our money is on the right or wrong side of climate history.

In a number of societies, demands for sustainability are approaching tipping points, giving newfound urgency to national commitments to net zero. This is reinforcing the hierarchy of values, with net zero at its apex, it is a prerequisite to solving the climate crisis. Legal scholar Cass Sunstein has documented how social movements that once seemed improbable, can unexpectedly gain traction. Within a few years, views that were publicly on the fringe suddenly become mainstream, causing more people to voice what's really inside their heads, reinforcing convictions and catalysing actions. The economists Tim Besley and Torsten Persson, argued that similar dynamics could be at work over climate change. The connections between changing environmental values, changing technologies and the changing environmental politics can drive self-reinforcing cycles. Greater consumer demand for sustainable products increased the economic returns to green technologies and the political returns to green policies, and this is how a path to a more sustainable world begins to appear.

In this context, finance can play a decisive role. The more the financial sector focusses on the transition to net zero, the more new technologies will be financed in anticipation of climate action, the more savers and investors will be able to track whether their investments are consistent with their values, and if not, the easier it will be to move those savings somewhere else. Sustainable investing can shift from the fringes to the mainstream, driving the transformation. This is how values drive value. And that's why our objective for Glasgow next year is to put in place the foundation so that every financial decision takes climate change into account. A financial system in which climate change is as much a determinant of a company's value as changes in credit worthiness or interest rates or technology, so that value reflects values.

To bring climate risks and opportunities into the heart of financial decision-making requires three Rs: the first is reporting. These lectures have argued that a common cause of the three crises of Credit, Climate and COVID is how we measure value. Indeed, past crises have usually forced improvements on how we measure the impacts of companies and the risks that they face. So following the Wall Street

crash of 1929, regulators created standardised accounting practices. Or for example, in the wake of the Global Financial Crisis ten years ago, there were a series of measures to improve the reporting of risks and exposures of banks. Since what gets measured gets managed, every major company should disclose how climate change affects its current business and how it could affect their strategies. Large companies should also develop and disclose their plans to move to net zero.

Now the gold standard for this reporting has been created by something called the TCFD, which is a private sector standard now backed by financial institutions, controlling 150 trillion dollars of assets. And that sounds like a lot and it is a lot. It's time for the G20 to make the TCFD mandatory for all large companies. Last month, the UK Government announced it will lead the way.

Secondly, climate risk management must be transformed. Climate risks are different from conventional financial risks, because they're unprecedented. So the past isn't a good predictor of the future. They're also likely to be both highly correlated and subject to tipping points, meaning that they could suddenly get a lot worse in a lot of places at the same time. As climate risks will ultimately affect every sector of the economy - that means that the financial system cannot diversify out of them. Indeed, we won't have a financial system if we don't have a planet.

Banks and insurers must help break the tragedy of the horizon by understanding the carbon emissions that they're financing, developing strategies for managing them down, and disclosing their plans to align with the transition to net zero. Now seventy central banks from countries responsible for three quarters of the world's emissions are working to help make this happen.

Thirdly, on returns. Addressing climate change is ultimately about delivering what society values. This means that the transition to a green economy can be the greatest commercial opportunity of our time. We'll increasingly view companies and assets through the lens of the climate transition. So who is on the right and the wrong side of climate history? Which companies have green momentum which could be climate roadkill?

We need to mobilise mainstream finance to help all companies get on track to net zero. Today, investors have a say on pay for executive pay packets, they should have a say on transition, specifically a vote on whether a company is taking the necessary steps to transition to a net zero world. This would embed a critical link between responsibility and accountability. But over time investors won't just judge company transition plans, they too shall be judged. Investors should disclose how closely their portfolios are aligned with the transition. A very basic approach is to report the percentage of their assets that have a net zero target. The most sophisticated and the most intuitive option is to assess the contribution of a pool of assets to global warming. And current calculations suggest the financial system as a whole is funding temperature increases of over three degrees centigrade. And that's a striking gap between what society wants and what the market values.

But exposing this gap should help close it. Rating the warming potential of investments will empower consumers - that's you - to direct your savings to support the transition. And already there are signs that this increased focus on sustainability is shifting market values. In particular, funding for new offshore oil price, projects implies a carbon price of over \$80 a ton. And the market capitalisation of disrupters in renewable energy in zero emission cars already exceed those of fossil fuel-based incumbents.

The more investors help portfolio companies and assets move towards net zero, the more they will reinforce the emerging engineering and political momentum I spoke about before, creating an impact that doesn't just make the weather, but literally, changes the climate. It's important to recognise that a whole economy transition isn't only about funding deep green activities, or blacklisting dark brown ones. We need fifty shades of green to catalyse and support all companies moving towards net zero. To conserve our carbon budget, companies will seek to meet their net zero targets through an appropriate

mix of emission reductions and credible carbon offsets, including nature-based solutions, such as re-forestation and the switch from brown to green power.

To unlock that market, which could be worth more than \$100 billion a year, we need the right infrastructure to connect demand from companies who have or are putting in place net zero goals, with supply of offsets in countries around the world. And a new private sector taskforce led by Bill Winters is working to create this critical market in time for next year's Glasgow summit.

Ultimately, the private sector needs effective public policies. These include tax and spending measures, such as carbon prices and targeted investments in emerging sectors, and it also means new rules, including mandates for clean fuels and greater energy efficiency. A critical point is that the more credible and predictable climate policies are, the more the financial system will anticipate future measures, and encourage companies to start adjusting today.

The solutions to the climate crisis are intimately tied to our fiscal economic and social wellbeing. We need to leverage these social coalitions that have formed for climate action, but those coalitions won't and shouldn't hold if we don't have a just transition. We can't achieve environmental sustainability if we sacrifice our economy and with it, peoples' livelihoods. Similarly, we won't devise all the necessary solutions or implement them with sufficient speed without market forces.

And let me suggest here's how you can reinforce these efforts. First, if you work for a company, find out whether it has a plan to transition to net zero. If so, great, how can it be made better? And if it doesn't have a plan, why not? Does management think governments and people are bluffing with their net zero targets? Or do they consider the company separate from society?

Secondly, wherever you put your hard-earned savings, in a bank, a pension pot, or in stock market, find out whether it's been managed towards net zero. And if not, why not? Are the people investing your money missing out on major opportunities or are they taking unnecessary climate risks, or do they think that you just don't care? If you care about the climate, make your money matter.

And third, ask not what the climate is doing to your country, but what your country can do for the climate. Does your country have a credible net zero plan? Does your government require large companies to disclose the impact of climate on their operations and must those companies have net zero plans? Do shareholders, ultimately you have an automatic vote on these plans? In other words, a say on transition. Are banks planning for climate failure and do they know how they can contribute to climate success?

The power of Greta Thunberg's message is how she drives home both the remorseless logic of climate physics and the fundamental unfairness of the climate crisis. And like many, I'm persuaded by the force of her argument and her demands for inter-generational justice. We do diverge, however, on how to solve this immense problem. As these lectures have argued, the market is not the answer to everything, but it can play a critical role in, in solving many of humanity's greatest challenges.

We won't get to net zero without innovation, investment and profit. Continued growth isn't a fairy tale, it's a necessity. But not just any growth, the power of the market must be directed to achieving what society wants, that requires measures of income and welfare that reflect our values, we need a world where we're no longer solely guided by measures like GDP, that were devised a century ago when the earth seemed immortal, and the social norms of the market felt immutable.

A market in the transition to net zero is now being built on these foundations of reporting risk management and returns. It's funding the initiatives and innovations of the private sector and it can amplify the effectiveness of climate policies of governments and accelerate the transition to that low carbon economy. It's turning an existential risk into one of the greatest commercial opportunities of our time. And it's now within our grasp to create a virtuous cycle of innovation and investment for the net zero world that people are demanding, and that future generations deserve. In this way, private finance

can bend the arc of history towards climate justice, value can serve values, moral sentiments can rebalance market sentiments, and the Glasgow of COP 26 can be reunited with the Glasgow of Adam Smith. Thank you very much.

[Virtual audience applause]

**Anita Anand:** Thank you so much. I'm really fascinated because on the one hand you're saying that the economy can move and reflect moral sentiments among people, and if you ask people they say, "Yes, I love my planet, I want to save the planet." But then they also want to fly, they want to drive in the cities...

**Dr Carney:** Yeah.

**Anita Anand:** ...they want cheap clothes, so that flow-back then, you're, you're counting on an awful lot to flow-back when actually, people have that basic desire too.

**Dr Carney:** There has been quite a lot of progress, if I can put it that way, through social movements, so social movements first, people's attitudes have shifted and they've shifted a great deal, such that, a political consensus has formed and has now been either, it's a stated objective in many cases, a legislative objective in 126 countries that says, "*This is where we are going to net zero.*"

What then cascades from that are a series of regulations, policies, objectives, but also a more general understanding of what's required. Now, there will be individual decisions that are not yet consistent with a net zero world, but there's the orientation that's there and it's a shift between a world where, what I was arguing, a flattening of values, so a classic economic approach, which is, climate versus economy, as opposed to climate hierarchy, economy organised in order to achieve that objective.

**Anita Anand:** I understand what you're saying and you know, you put it very well. I suppose what I'm, I'm trying to say or trying to ask, we have a system of democracy where politicians are tied into that short termism..

**Dr Carney:** Yeah.

**Anita Anand:**...of an electoral side, election cycle, and you're talking about 2050. Is this anything other than green window dressing?

**Dr Carney:** No, absolutely not. I totally reject that premise of that question. To use the term "green window dressing", is to de-value the views of millions of people in this country. And I'll go back to my native Canada, for example. It's 70 percent plus of the votes in the, which also a net zero country, 70 percent plus of the votes in the election were for parties that had that as an objective. That's not window dressing.

**Anita Anand:** Okay. Well, let, open this up now to questions from our virtual audience and we can take our first question now from Gail Bradbrook, who's co-founder of Extinction Rebellion... Gail.

**Ms Bradbrook:** Thank you. Dr Carney, for over 30 years these crises have been accelerating to the point that we're now in an absolute emergency and it's frankly, already too late for some parts of the world. We've been told repeatedly that the current political economy can provide the answers, ignoring systematic faults invested interests in the way of change. Isn't the real question here then, how we go about redesigning this political economy in a way that includes other voices, values, and other ideas that should also be heard and so I'm asking if you would support in principle a global citizens assembly where people from all walks of life work with a variety of experts to design a regenerative political economy, one which serves all people and protects life on earth?

**Dr Carney:** Thanks for the question Gail, and the proposal. My view is that we have some in order to shift the economy there will be required some huge investments and some major innovations, the understanding for those who will make those investments and those who will be incentivised to make those innovations, the understanding that this is where society wants to go, and the transparency around that is what is going to accelerate the ability to get there. And I don't think that necessarily, with respect, that a global citizens assembly is, it, it might reinforce the objectives but it will not crack green hydrogen, which is one of the things, for example, one of the technologies, which is necessary.

**Anita Anand:** We've got the historian Niall Ferguson... Niall Ferguson, what did you want to ask?

**Mr Ferguson:** Well, Mark congratulations on these lectures. As a Glaswegian I was very happy to hear Glasgow and Adam Smith feature throughout. I have a couple of questions. You referenced Greta Thunberg but didn't make any mention of Bjorn Lomborg, and I thought that was a pity because he's another influential Scandinavian whose views in some ways seem closer to yours, after all, Greta Thunberg called in Davos in January for an immediate cessation of emissions and we immediately found out what that would mean economically because COVID-19 forced very drastic reductions in economic activity. It reduced emissions but it created massive unemployment, so I wonder if you could say a few words about Lomborg's views, particularly in his most recent book, *False Alarm*. My second question has to do with China, of which seems to me the key problem here since the Paris Climate Agreement was signed, 48 percent of the increase in CO2 emissions is due to China and China's building more coal burning power stations this year than exist in the entire United States right now, all the existing coal burning capacity is going to be built in a single year in China. If China's not constrained promises to get to net zero by 2060 doesn't really mean terribly much if in the interim China is actually leading the pollution charge..?

**Dr Carney:** Two meaty questions...I haven't read Bjorn Lomborg's latest book. But I'll say this, that one of the things about his approach, which is a sort of, which is a classic economic approach, which is actually what I'm arguing against. But I want to say it's 15 or 20 years ago when he first came out with his, "Don't worry about the Climate." How's that working out for us?

Secondly, on China, there's a global solution in China is needed incredibly important, you could have also said that China is the biggest producer of zero emission cars, they're the biggest renewable energy producer, leader on that. They have to get off coal, without question. It is significant that in the past few weeks that they have an explicit net zero commitment now, which they didn't have before and one of both the responsibilities and the opportunities for countries like the UK is to be a little ahead in driving down the costs of some of the solutions here. But China will have to be part of it and as much a part of the solution as the UK.

**Anita Anand:** Okay, we'll go back very briefly to Niall Ferguson.

**Mr Ferguson:** The China problem though for me is the big one and until we have an answer to how can China be held to its commitments, then I don't know that we really have anything meaningful in the Paris Accord.

**Anita Anand:** Okay. Niall Ferguson, thank you very much indeed. One of the first times the world sort of thought about the economics of climate change was in 2006 with the Stern review. We have next with us Chair of the Grantham Research Institute on Climate Change, and the Environment at the LSE and of course former Chief Economist at the World Bank, Nick Stern.

**Mr Stern:** Thank you Mark for a splendid lecture. It is true that momentum is building and there's a better sense of direction now but while emissions are still rising, we're moving clearly much too slowly, so the challenge is, how do we really pump up the pace? How do we get the acceleration that we need and that we need now to cut emissions by 50 percent over this next decade?

**Dr Carney:** One element of this is aligning the financial sector and making it very clear the financial sector, whether or not, it is itself aligned towards net zero, so it is always asking the question of companies whether or not they have a plan, it's judging those companies that have a plan. And it's making it clear to everyone listening and, and by extension, everyone whose savings, it's ultimately people's savings, whether it's in a big fancy institution or, or a small, you know, building society, making it clear whether or not their savings are being invested consistent with that. It's not *the* answer, but it is part of the answer.

**Anita Anand:** Well, let's now cross over to Nigeria to Stephanie Ohumu, who is the founder of *Ubeni*, it's a social enterprise engaging Nigerians for climate action.

**Ms Ohumu:** Hi, a changing climate effects the poorest people in the least developed countries in most countries like Nigeria where I'm from, and they do not necessarily have the money needed to mitigate and adapt to these changes and there are those like me who believe that the G20 countries are responsible for around 80 percent of global greenhouse gas emissions, have an obligation to efficiently formed climate resilience in poorer countries. I'd just like to ask if you agree, and how the international finance industry can help to make sure that its financing is done efficiently?

**Dr Carney:** Yeah...I agree there is a responsibility, secondly, that there are several ways that that responsibility can be met. The first is through the hundred billion which is part of the Paris Accord and has to be met. Secondly, is making sure that the development banks in this world, so think the World Bank and the African Development banks and others are using their funds with the private sector to have much bigger numbers than that hundred billion. And then the third is there are ways of making sure that companies and financial institutions, when they start thinking of net zero, because many of these companies are global companies, they have activities in Nigeria, they have supply chains that reach into Asia, and they have to sort out the carbon emissions from all the way through from the consumer through to the supply chain. So all of a sudden they have to invest in these economies to reduce emissions there as well, which has a multiplier effect.

**Anita Anand:** Stephanie, thank you very much indeed for your question. Sir David King is with us, former Government Chief Scientific Adviser and Climate Negotiator. Do you share the optimism of Mark Carney?

**Dr King:** Am I optimistic..? I am extremely worried and the optimism I have is now rapidly melting away as the ice begins to melt from the two polar regions...

**Dr Carney:** Yeah.

**Dr King:** Many scientists, and I'm one of them, now believe that the melting of the poles has passed a tipping point. But even at the present time, if we look ahead to just the mid-century, 2050, countries like Vietnam will be so frequently flooded that they will be effectively unable to sustain a population. And just near them, Indonesia, we can see Bangladesh, we can see the cities of Calcutta and Mumbai also being un-liveable because of frequent flooding. I'm heavily focussed now not only to get deep and rapid emissions reduction, and I fully applaud everything you've said about that but we also now need to learn how to remove greenhouse gases at scale..?

**Dr Carney:** A couple of comments, and thank you Dr King but I re-emphasise that there are a series of measures and, and I mentioned in the speech, that 60 percent of the...of the reductions we need are now actually economic, the technologies are economic. Now, they may be overcome by, if these tipping points come into play, that which was just discussed. But it does buy some of the time. Secondly, direct air capture, if I can simplify it to that, so sucking carbon out of the atmosphere or even bigger geo-engineering which you're probably thinking of as well. Yes, direct air capture is going to be necessary as part of the solution, even before these bigger tipping points come into place.

**Anita Anand:** David King, thank you very much indeed for your question. We're almost out of time but just one final thing. You know I was talking to some friends of yours and one of them said, "What are we going to do with Mark Carney? He's achieved a lot, a central Banker for two countries, now working on climate change. Surely your end destination is going to have to be politics".. is that ultimately where the power will lie at the end of the day?

**Dr Carney:** I think what this discussion, this great discussion underscores is there's many, many sources of power and influence, from social movements to scientific research to historians who can make sense of the past, to inform the future, to even you know, heaven forbid, the financial sector that can be part of the solution, so hopefully I'll still be involved in whatever area influences the better outcomes.

**Dr Carney:** There's many, many paths.

**Anita Anand :** So not ruling it out but not saying specifically it's going to happen?

**Dr Carney:** Look at the time.

**Dr Carney:** We'll focus on, we'll focus on doing what -----

**Anita Anand :** Well -----

**Dr Carney:** ----- we can for COP and, and those watching and listening, if they could weigh in and help however they feel -----

**Anita Anand:** Okay.

**Dr Carney:** ----- would best contribute to it.

**Anita Anand:** That was deftly side-stepped! Thank you so much indeed.

We hope you have enjoyed this series. All of Mark's lectures are going to be available on the Reith website and of course, you can see them whenever you like on the BBC iPlayer. A very big thank you to all of you for being with us for your questions. The biggest thanks of all though to the BBC 2020 Reith Lecturer, Dr Mark Carney.

[Virtual audience applauding].

END OF TRANSCRIPT