Rt Hon Michael Gove MP
Secretary of State for Environment, Food and Rural Affairs
Department for Environment, Food and Rural Affairs

22 March 2018

Dear Michael

The Environmental Audit Committee is writing regarding Defra's consultation into Adaptation Reporting Power to recommend that the Government formally require the Pensions Regulator, Financial Conduct Authority and Financial Reporting Council to produce adaptation reports in respect to their public functions.

As you are aware, the committee is currently conducting an inquiry into Green Finance examining how the UK can mobilise the investment necessary to meet our climate change targets and factor sustainability into financial decision-making. During this inquiry the Bank of England has told us that:

> *'…climate change, and society's response to it, present financial risks that speak to our objectives of the safety and soundness of the firms we regulate and the stability of the financial system.'*[1]

We are pleased to note that the Department has approached the tPR, FCA and FRC to engage with them on the possibility of participating voluntarily in the third cycle of adaptation reporting. The Adaptation Reporting Power (ARP) was intended to ensure that climate change risk management is systematically undertaken by bodies with public functions. Given the recent work by the Bank of England and Task Force on Climate-related Financial Disclosures identifying financial risks from climate change – *at both micro and macro levels - we believe it is imperative that the tPR, FCA and* FRC prepare adaptation reports to consider the implications of climate change for their areas of regulatory oversight.

In his September 2015 speech on 'the Tragedy of the Horizon' the Bank Governor, Mark Carney, warned that the timescales involved in climate change mean that regulators and other actors may be late to recognise and respond to the risks:

> *'We don't need an army of actuaries to tell us that the catastrophic impacts of climate change will be felt beyond the traditional horizons*

[1] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78606.pdf

of most actors – imposing a cost on future generations that the current generation has no direct incentive to fix. That means beyond: the business cycle; the political cycle; and the horizon of technocratic authorities, like central banks, who are bound by their mandates.'[2]

Evidence to the inquiry has echoed Governor Carney's concerns and also suggests that a common problem – amongst both regulators and financial actors - is the perception of climate change as an ethical issue, rather than a potential material risk. Client Earth said:

Our view, as lawyers, is that there are more than enough laws out there. They are just not being used effectively, and what we are seeing is that climate change has moved from an ethical environmental issue to a core business issue. That core message is not being picked up by regulators themselves because they are also caught in short-term horizons. Nor is it being picked up by industry companies and investors. [3]

The Law Commission has pointed out in reports published in 2014 and in 2017 that the conflation of 'social, environmental or ethical considerations' is confusing and that material environmental risks can be considered financial factors. The Bank of England and others have also pointed out during our inquiry that climate change is not just a corporate social responsibility issue, but must now be considered a real material risk, particularly to long-term investments like pensions. As the chair of HSBC's pension scheme Russel Picot said:

'The country's pension schemes are DB or DC so if you are a member of a defined contribution pension scheme—that is most young people nowadays—the reality is that you are probably going to be 40 to 50 years away from retirement, and whatever those sorts of timescales climate risk and ESG factors will be material to the financial performance of your funds. I think that is almost a statement of the obvious.'[4]

A young person auto-enrolled on a pension today may be 45 years away from retirement. Over that timescale climate change risks will inevitably grow as we have heard in our inquiry. The insurance and asset management firm, Aviva, presented a

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[2] https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability

[3] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78347.pdf

[4] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78347.pdf

sobering assessment of the possible extent of climate change risks to the economy over the course of the twenty first century:

> *'If you look at the trajectory, even now post the Paris agreement, we are talking about 2.7 degrees of change is plausible. Many scientists are saying that 4, 5, 6 degrees is at least a risk that we need to be considering. At 4 degrees the insurance business model fails to exist. We could not underwrite to the price that the economy can afford. At 6 degrees the present value of getting to 2100 and seeing a 6 degree change, according to an economist intelligence unit study that we sponsored, the present value of risk from 6 degrees change is £42 trillion. Of course, these are models but, in terms of the hazards that we would experience, we are talking about economic meltdown.'*[5]

The physical impacts of climate change are already being felt around the world and regulatory action to curtail the use of carbon intensive fuels is increasing across jurisdictions in the wake of the Paris Agreement. Yet, amongst financial regulators in the UK, only the Bank of England and its Prudential Regulation Authority have given the issue serious attention. Our green finance inquiry has led us to conclude that there is a case for other regulators to use the opportunity of the current reporting round to integrate climate change risk management into their work.

The Pensions Regulator (tPR)

Considering climate change risk from the perspective of pension regulation is especially important given the long time-scales involved in pension saving. Given the Pension Regulators role in providing guidance to pension fund trustees on governance and how best to engage with beneficiaries around the Statement of Investment Principles and sustainability issues, we believe it would be timely for the tPR to participate in this round of Adaptation Reporting.

A number of inquiry submissions also point out that there is currently a disparity in the guidance to trust based pension schemes (regulated by the Pensions Regulator) and contract based schemes (overseen by the Financial Conduct Authority) when it comes to considering environmental risk as a financial factor. Completing Adaptation Reports to assess the risk facing long term pension savings could help to address these disparities.

Financial Conduct Authority

We are particularly concerned that the Financial Conduct Authority needs to develop its thinking in this area. The physical impacts of extreme weather and flooding linked

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[5] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/77028.pdf

to climate change was identified as a risk in the FCA's latest Risk Outlook included in its Business Plan 2017/18. The language used in the FCA risk outlook would suggest the FCA perceives the risk as being confined to the insurance sector related in any impact it may have on financial services (and risks to FCA objectives). The risk outlook made no mention of the liability risks identified by the Bank of England or the transition risks highlighted by both the BoE and TCFD, such as those potentially facing fossil fuel companies that do not diversify and make a timely transition to cleaner forms of energy production.

Following the Financial Conduct Authority's appearance before the committee on the 20th February we are not convinced that the regulator understands the material risks that climate change poses. The witness gave the impression that the FCA considers climate change as an ethical option, rather than a potentially serious financially-material risk for pension funds and businesses. When asked when the FCA would update guidance to reflect the Law Commission's clarification that environmental, social and governance factors can be considered material risks and as such are financial factors, he said:

> *'There is a potential tension with the fact that people are under-saving towards their pensions, they are expecting companies to maximise returns, and in some cases they may be giving up returns by taking some form of social investment as an aspect of their pension funds.*
>
> *The Law Commission also said—again, we agree—that firms should understand the investment objectives of their scheme members. If their scheme members share those concerns, of course they should act on that. They should invest in accordance with the wishes of their members.'*[6]

Financial Reporting Council

The environmental lawyers Client Earth told us in evidence that 'we have seen a number of examples of failures by regulators, such as the Financial Reporting Council (FRC), to properly scrutinise and enforce existing corporate disclosure law as they relate to climate change.'[7] Client Earth highlighted a case from August 2016, where brought a complaint against the FRC for failing to challenge two oil and gas exploration companies - Cairn Energy (Cairn) and SOCO International - for making no mention of climate change in their Strategic Reports.

Given the FRC's role in monitoring the annual climate-related financial disclosures – *recommended by the Task Force on Climate-related Financial Disclosures and* endorsed by the Government – and setting the Corporate Governance Code and

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[6] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78606.pdf

[7] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/written/76268.pdf

Stewardship Codes, we believe it would be appropriate and timely for the regulator to consider how climate risks and opportunities are relevant to its area of oversight.

The committee asked the FRC whether it would be prepared to produce Adaptation Reports at our recent hearing with financial regulators and we were pleased with its positive response:

> *'Q337 Chair: Before we move on, I am going to go back to the regulators. DEFRA is consulting on this adaptation reporting power. We have heard the power of an adaptation report being produced on the insurance industry from the Bank of England. Do you commit to producing an adaptation report in this round of reporting, examining the risks of climate change on your area that you supervise?*
>
> *Stephen Haddrill: Yes, I think we should understand it much better than we do.*
>
> *Q338 Chair: Are you going to produce an adaptation report?*
>
> *Stephen Haddrill: I will look at producing a report in this area. I just need to get more familiar with exactly what is required and the extent to which it is relevant.'*[8]

In conclusion, financial regulators have a responsibility to understand risks to financial stability and the financial institutions which they supervise. Evidence to our inquiry has suggested that there are failings in how the UK's framework of financial regulation is currently monitoring climate change risk management. Given the long time-scales involved in pension saving there seems to us a case for both the tPR and FCA to integrate climate change risk management into their work. The FCA particularly seems to particular need to update its thinking on this, given its lack of guidance to contract based pension schemes on environmental risks and the limitations of its Risk Outlook on climate change. If financial regulators are not asked to report in this reporting round, it would be a missed opportunity for them to properly consider and integrate climate change risk management into their work.

Yours sincerely,

Mary Creagh MP

Chair of the Environmental Audit Committee

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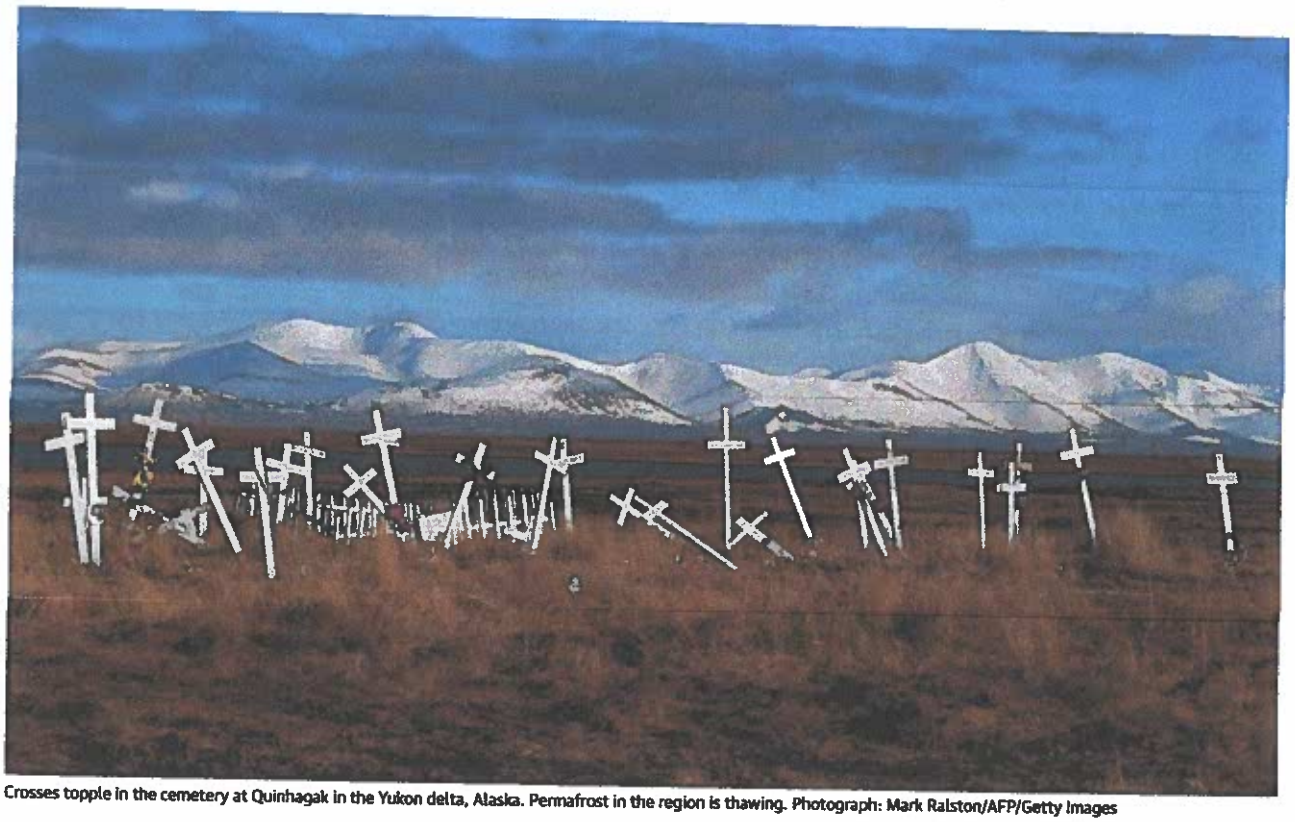
[8] http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/green-finance/oral/78606.pdf

The Guardian

The heat is on over the climate crisis. Only radical measures will work

Gaia Vince

Sat 18 May 2019
16.00 BST



Crosses topple in the cemetery at Quinhagak in the Yukon delta, Alaska. Permafrost in the region is thawing. Photograph: Mark Ralston/AFP/Getty Images

Experts agree that global heating of 4C by 2100 is a real possibility. The effects of such a rise will be extreme and require a drastic shift in the way we live

Drowned cities; stagnant seas; intolerable heatwaves; entire nations uninhabitable... and more than 11 billion humans. A four-degree-warmer world is the stuff of nightmares and yet that's where we're heading in just decades.

While governments mull various carbon targets aimed at keeping human-induced global heating within safe levels - including new ambitions to reach net-zero emissions by 2050 - it's worth looking ahead pragmatically at what happens if we fail. After all, many scientists think it's highly unlikely that we will stay below 2C (above pre-industrial levels) by the end of the century, let alone 1.5C. Most countries are not making anywhere near enough progress to meet these internationally agreed targets.

Climate models predict we're currently on track for a heating of somewhere between 3C and 4C for 2100, although bear in mind that these are global average temperatures - at the poles and over land (where people live), the increase may be double that. Predictions are tricky, however, as temperatures depend on how sensitive the climate is to carbon dioxide (CO_2). Most models assume that it is not very sensitive - that's where the lower 3C comes from - but a whole new set of models to be published in 2021 finds much greater sensitivity. They put heating at around 5C by the end of the century, meaning people could be experiencing as much as 10C of heating over land.

Such uncertainty isn't ideal, but for our purposes let's plump for an entirely feasible planetary heating of 4C by the end of the century. If that seems a long time away, consider that plenty of people you know will be around then. My children will be in their 80s, perhaps with middle-aged children and grandchildren. We are making their world and it will be a very different place.

Four degrees may not sound like much - after all, it is less than a typical temperature change between night and day. It might even sound pleasant, like retiring from the UK to southern Spain. However, an average heating of the entire globe by 4C would render the planet unrecognisable from anything humans have ever experienced. The last time the world was this hot was 15m years ago during the miocene, when intense volcanic eruptions in western North America emitted vast quantities of CO_2. Sea levels rose some 40 metres higher than today and lush forests grew in Antarctica and the Arctic. However, that global heating took place over many thousands of years. Even at its most rapid, the rise in CO_2 emissions occurred at a rate 1,000 times slower than ours has since the start of the Industrial Revolution. That gave animals and plants time to adapt to new conditions and, crucially, ecosystems had not been degraded by humans.

Things look considerably bleaker for our 2100 world. Over the past decade, scientists have been able to produce a far more nuanced picture of how temperature rise affects the complexities of cloud cover and atmospheric and oceanic circulation patterns and ecology. We're looking at vast dead zones in the oceans as nutrients from fertiliser runoff combine with warmer waters to produce an explosion in algae that starve marine life of oxygen. This will be exacerbated by the acidity from dissolved CO_2, which will cause a mass die-off, particularly of shellfish, plankton and coral. "We will have lost all the reefs decades before 2100 - at somewhere between 2C and 4C," says Johan Rockström, director of the Potsdam Institute for Climate Impact Research in Germany.

Sea levels will be perhaps two metres higher and, more worryingly, we will be well on our way to an ice-free world, having passed the tipping points for the Greenland and west Antarctic ice sheets, committing us to at least 10 metres of sea-level rise in coming centuries. That's because as

ice sheets melt, their surface drops to a lower altitude where it is warmer, speeding up melting in a runaway feedback loop. Eventually, dark, heat-absorbing land is exposed, speeding the melting process even more. By 2100, we will also have lost most low-latitude glaciers, including two-thirds of the so called third pole of the Hindu Kush-Karakoram-Himalayan mountains and Tibetan plateau that feeds many of Asia's important rivers.

However, most rivers, especially in Asia, will flood more often, according to research by Richard Betts, head of climate impacts at the Met Office Hadley Centre, because the hotter atmosphere will produce more intense monsoons, violent storms and extreme rainfall. His studies predict a wide equatorial belt of high humidity that will cause intolerable heat stress across most of tropical Asia, Africa, Australia and the Americas, rendering them uninhabitable for much of the year. Tropical forests of heat-tolerant species may well thrive in this wet zone with the high CO_2 concentrations, especially with the disappearance of human infrastructure and agriculture, although the conditions will probably favour lianas (vines) over slower-growing trees, Betts says. To the south and north of this humid zone, bands of expansive desert will also rule out agriculture and human habitation. Some models predict that desert conditions will stretch from the Sahara right up through south and central Europe, drying rivers including the Danube and the Rhine.

In South America, the picture is more complicated: increased precipitation could enhance the Amazon rainforest, leading to mightier river flow. Other models predict a weakening of the easterlies over the Atlantic, drying the Amazon, increasing fires and turning it from forest to grassland. The tipping point for the Amazon could well be triggered by deforestation; while the intact forest could cope with some drought because it generates and maintains its own moist ecosystem, areas that have been opened up through degradation allow moisture to escape. "A combination of climate change and deforestation could push it into a savannah state," Rockström says.

All of nature will be affected by the change in climate, ecosystems and hydrology and there will be plenty of extinctions as species struggle to migrate and adapt to an utterly changed world. Daniel Rothman, co-director of MIT's Lorenz Center, calculates that 2100 will herald the beginning of Earth's sixth mass extinction event. But what about us? This is undoubtedly a more hostile, dangerous world for humanity, which by 2100 will number around 11 billion, all of whom will need food, water, power and somewhere to live. It will be, in a giant understatement, problematic.

The good news is that humans won't become extinct - the species can survive with just a few hundred individuals; the bad news is, we risk great loss of life and perhaps the end of our civilisations. Many of the places where people live and grow food will no longer be suitable for either. Higher sea levels will make today's low-lying islands and many coastal regions, where nearly half the global population live, uninhabitable, generating an estimated 2 billion refugees by 2100. Bangladesh alone will lose one-third of its land area, including its main breadbasket.

From 2030, more than half the population will live in the tropics, an area that makes up a third of the planet and already struggles with climate impacts. Yet by 2100, most of the low and mid latitudes will be uninhabitable because of heat stress or drought; despite stronger precipitation, the hotter soils will lead to faster evaporation and most populations will struggle for fresh water. We will have to live on a smaller land surface with a larger population.

Indeed, the consequences of a 4C warmer world are so terrifying that most scientists would rather not contemplate them, let alone work out a survival strategy.

Rockström doesn't like our chances. "It's difficult to see how we could accommodate a billion people or even half of that," he says. "There will be a rich minority of people who survive with modern lifestyles, no doubt, but it will be a turbulent, conflict-ridden world."

Children paddle rafts through the streets in Kurigram District, Bangladesh, September 2015. Photograph: Zakir Hossain Chowdhury/Barcro

He points out that we already use nearly half the world's ice-free surface to produce food for 7 billion people and thinks meeting the needs of 11 billion in such hostile conditions would be impossible. "The reason is primarily making enough food, but also we would have lost the biodiversity we're dependent on and be facing a cocktail of negative shocks all the time, from fires to droughts."

Others are more sanguine. "I don't think that humans as a species or even industrial civilisation is seriously threatened," says Ken Caldeira, climatologist at the Carnegie Institution for Science in California. "People live in Houston, Miami and Atlanta because they live in air conditioning through the hot summers. If people are rich enough to air-condition their lives, they can watch whatever is the successor to *Game of Thrones* on TV, as the natural world decays around them," he says. But he points out that while richer people risk a loss to their quality of life, the poorer risk their actual lives.

So how might we give all of humanity the best chance?

Our best hope lies in cooperating as never before to radically reorganise our world: decoupling the political map from geography. However unrealistic it sounds, we'd need to look at the world afresh and see it in terms of where the resources are and then plan the population, food and energy production around that. It would mean abandoning huge tracts of the globe and moving Earth's human population to the high latitudes: Canada, Siberia, Scandinavia, parts of Greenland, Patagonia, Tasmania, New Zealand and perhaps newly ice-free parts of the western Antarctic coast. If we allow 20 sq m of space per person - more than double the minimum habitable space allowed per person under English planning

regulations - 11 billion people would need 220,000 sq km of land to live on. The area of Canada alone is 9.9m sq km and, combined with all the other high-latitude areas, such as Alaska, Britain, Russia and Scandinavia, there should be plenty of room for everyone.

These precious lands, with tolerable temperatures and access to water, would also be valuable food-growing areas, as well as the last oases for many species, so people would need to be housed in compact, efficient high-rise cities with reflective roofs and resource-recycling systems. That risks raising local temperatures to intolerable levels, because compact cities function as heat islands, so solar-powered cooling or even artificial winds would be needed to counteract this. There is also an increased risk of epidemics in such densely populated spaces.

Peter Cox, a climatologist at the University of Exeter, thinks this is viable, but would require a massive programme of infrastructure to manage waste, air quality and water needs. City-scale underground reservoirs could supply domestic needs and efficient recycling would keep water - and other resources - circulating in the population for years rather than hours. Post-fossil fuels, we will require unprecedented electricity production. This could come from vast arrays of solar- and wind-power plants in a belt across the uninhabitable desert regions. High-voltage direct current transmission lines could relay this power to the cities or it could be stored as thermal energy in molten salts and transported in hydrogen - after solar energy is used to split water to provide hydrogen for fuel cells.

Hydrogen production will be on an industrial scale and it could be used for nonelectric transport, for instance. Wave farms, nuclear fission (and potentially fusion) and solar power will help meet our electricity needs. In the meantime, the effective capture from the air of today's carbon emissions will with luck be a reality; they can be stored or used in the manufacture of materials.

Food production will need to be more intensive, efficient and industrial. This will be a mostly vegetarian world, largely devoid of fish and without the grazing area or resources for livestock. Poultry may be viable on the edges of farmland and synthetic meats and other foods will meet some of the demand. Heat-tolerant, drought-resistant crop varieties, such as cassava and millet, will replace many of our current unmodified staples such as rice and wheat and they will grow faster and with greater water efficiency because of the high CO_2 levels.

One problem is that almost all of our agriculture will need to be at higher latitudes, because the tropics will be too dry or too hot for farmworkers. And that means less land and less sunlight in winter. "Global agriculture could be limited by the geometry of Earth's orbit around the sun," Cox says. "However, studies have shown that crops thrive with artificial light delivered by LEDs at exactly the right frequencies for photosynthesis. This means we could grow crops through the winter months, hydroponically in smaller spaces, stacked up in warehouses or even underground, leaving valuable land surfaces for other uses."

Cultivation of algal mats and crops grown on floating platforms and in marshland could also contribute, while crops could potentially be grown in uninhabitable regions, farmed and processed remotely by artificial farmers. Either way, we would need to use far more precise nutrient and irrigation systems to avoid polluting more fertile ecosystems and reduce food loss and waste.

A 4C warmer world may well be survivable, but it would be eminently poorer than the one we currently enjoy. Rockström believes it takes us beyond our adaptation capabilities. Delivering our children to such a deadly home is a horrifying proposition.

Given what's at stake, it may be worth deploying geoengineering tools, which reflect the sun's heat away from Earth, and so keep global heating to safe levels. This wouldn't address the problem of dissolved carbon killing oceanic life, but it could buy us more time to decarbonise and achieve negative emissions. Crucially, keeping Earth cooler for longer would help the poorest people to adapt. "We have come to a point where different forms of geoengineering cannot be excluded," admits Rockström, "but SRM [solar radiation management] is a very dangerous geopolitical tool to deploy: who decides which part of the globe to shade? How would we govern it?" he asks.

We've already warmed the world by 1.1C, and we're experiencing the effects: the International Federation of the Red Cross estimates there are as many as 50 million climate refugees. Once we reach 4C, most models agree it will be impossible to return to today's abundant world.

"For me, the issue is that we are transforming (and simplifying!) our world for many thousands of years into the future with millennia of rising sea [levels], acidified oceans and intolerable tropical temperatures, just because we weren't willing to pay the small differential between fossil-fuelled prosperity and prosperity fuelled by non-greenhouse-gas-emitting energy systems," says Caldeira.

We are now making the climate of 2100 and however hard it seems to meet our emissions targets, it'll be far harder for our children if we don't. With international cooperation and regulation, we can make it livable.

National Infrastructure Commission welcomes government plans to tackle drought and leakage

font size | Print

The National Infrastructure Commission (NIC) has welcomed moves by ministers to tackle water leakages and drought which will be set out in a draft National Policy Statement this week.

The Commission was responding to commitments set out in a speech by Environment Secretary Michael Gove yesterday at the launch of the UK Climate Impacts Report 2018 on the Government's approach to storing and managing water.

The Minister told his audience that climate change would "manifest itself most acutely" in the hydrologic system, saying:

"The intense rainfall of the winter, the arid heat of the summer, and rising sea levels will be how we experience climate change most immediately in our everyday lives. "

Environment Agency planning flood defences on basis of 4 degree temperature rise

While successive Governments have made good progress on mitigating flood risk, he continued, as the risk of flooding and coastal erosion increases, a new long-term approach is needed. The Government will publish a long term policy statement next year and the Environment Agency will issue a new 50-year strategy, also next year.

Commenting on temperature rise caused by GHG emissions, he said:

"We are aiming to limit warming to well below 2 degrees - but the Environment Agency is preparing for 4 degrees when planning flood defences."

NATIONAL GEOGRAPHIC

https://www.nationalgeographic.com/environment/2019/03/climate-change-model-warns-of-difficult-future.html

ENVIRONMENT

Climate study warns of vanishing safety window—here's why

Millions of possible scenarios were analyzed, and only a few are acceptable, the scientists said.

BY STEPHEN LEAHY

PUBLISHED MARCH 12, 2019

A new scientific analysis of millions of possible climate futures found only a narrow window to keeping global warming to levels the international community has deemed safe.

Out of 5.2 million possible climate futures, carbon emissions must reach zero by 2030 in every country in the world if we are to stay at less than 3.6 degrees Fahrenheit (2 degrees Celsius) by 2100 of warming, the target set by the United Nations to avoid the worst impacts of climate change, from rising seas to deadly heat waves.

And unlike last fall's "Special Report on Global Warming of 1.5°C" from the Intergovernmental Panel on Climate Change (IPCC)—which held out the possibility of a 2.7 degree Fahrenheit (1.5 degree Celsius) climate future—the new paper published March 11 in the journal *Nature Climate Change* employed three practical constraints: spending to cut carbon emissions would be no more than three percent of global GDP per year; no use of geoengineering or technologies to remove carbon; and the climate's response to doubling carbon in the atmosphere would be at the median level or higher. The latter is called climate sensitivity—how much warming happens when carbon is added to the atmosphere.

"We show that our generation has an important responsibility to ensure that coming generations have a tolerable future," the paper concluded.

For comparison, under the 2015 Paris climate agreement if countries meet their pledges, emissions will continue to grow and peak by 2030, putting the world on a path to global warming of 5.4 degrees Fahrenheit to 6.3 Fahrenheit (3.0 C to 3.5 C).

Surging oil use

Global emissions are currently over 40 billion tons a year and increased the last two years. Meanwhile the International Energy Agency announced on March 11 that oil consumption will continue to grow over the next five years, driven by increased demand for jet fuel and petrochemicals.

Cutting emissions to zero by 2030 to meet the 3.6 degrees Fahrenheit (2 degrees Celsius) target will be exceptionally difficult, said lead author Jonathan Lamontagne of Tufts University. And there is no path to 2.7 degrees Fahrenheit given the constraints used in the paper, he said.

That finding echoes the IPCC Special Report, which found the only way to keep global warming to 2.7 degrees Fahrenheit was the

Climate change

This article is more than 1 month old

Climate crisis: flooding threat 'may force UK towns to be abandoned'

Sandra Laville
Thu 9 May 2019
00.01 BST

Environment Agency calls for urgent action to protect country from river and coastal floods

Entire communities might need to be moved away from coasts and rivers as the UK takes urgent action to prepare for an average global temperature rise of 4C, the Environment Agency warned.

The agency said on Thursday that difficult decisions would have to be taken in the coming years to make sure the UK was resilient amid flooding that would not be held back by higher sea and defences.

Emma Howard Boyd, chair of the agency, set out the regulator's long-term strategy for tackling flooding and coastal change, which, she said, was a preparation for a 4C rise in global temperatures. The rise is far in excess of the target of 1.5C above pre-industrial levels set in the legally binding Paris Agreement of 2015.

Earth's temperature to rise 1.5C as early as 2030 amid dire warnings from UN climate panel

4°C = Unlivable

By Our Foreign Staff
8 OCTOBER 2018 • 6:00AM

Avoiding global climate chaos will require a major transformation of society and the world economy that is "unprecedented in scale," the UN said on Monday in a landmark report that warns time is running out to avert disaster.

Earth's surface has warmed one degree Celsius - enough to lift oceans and unleash a crescendo of deadly storms, floods and droughts - and is on track towards an unliveable 3C or 4C rise.

At current levels of greenhouse gas emissions, we could pass the 1.5C marker as early as 2030, and no later than mid-century, the Intergovernmental Panel for Climate Change (IPCC) reported with "high confidence".