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THE VALUE OF CLIMATE COOPERATION

NETWORKED AND INCLUSIVE MULTILATERALISM TO MEET 1.5°C

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"Limiting warming to 1.5°C is possible within the laws of chemistry and physics but would require unprecedented transitions in all aspects of society"

Foreword, IPCC Special Report on Global Warming of 1.5°C

"I want people and the government to act. I want us to change the way we live"

Hilda Nakabuye

"The Paris Agreement "won't save the planet, [but] it may have saved the chance to save the planet"

Bill McKibben

The UNFCCC is "a central node in an increasingly complex governance ecosystem"

Thomas Hale

CONTENTS

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KEY FINDINGS

The picture on climate change is bleak. But 30 years of international climate cooperation have had a significant impact. This has included an extraordinary global effort to clarify the science, global agreement of a stabilization target, an international treaty basis for mitigation and adaptation action, and a wide array of partnerships that have driven up ambition and developed technical solutions.

Without this cooperation, the world would already face even more dangerous and irreversible levels of climate change – and would have none of the tools we need to effect a low-carbon transition. We present three scenarios:

Into the Abyss – where there has been no international action on climate change. In this scenario, the world would already be at or over the 1.5°C threshold and would be committed to an estimated 4.4°C of warming and >30% loss of global GDP by 2100.

Base Camp – which describes our current trajectory, with climate cooperation cutting our trajectory to an estimated 2.7°C of warming by the end of this century (range: 2.1°C - 3.5°C).

Ascend the Summit – which assumes the world takes immediate and decisive action to shift our trajectory down towards 1.5°C, with at least $36.4 trillion of averted costs through a transformation that relies on more equal societies, a stronger social contract, and greater empowerment of women.

Throughout its history, international climate cooperation may often have failed to deliver as anticipated, but each crisis in the negotiations has encouraged the emergence of more networked and inclusive models of multilateralism. The past thirty years have seen unprecedented cooperation to build the scientific evidence, agree a global goal, design governance systems that can ratchet up ambition in line with the science, and drive the technological advances we now need to deploy at scale. Progress to date, though, has been foundational rather than transformational.

The gap between the *Into the Abyss* and *Base Camp* scenarios can be measured in millions of lives and trillions of dollars but impacts and costs at *Base Camp* remain catastrophically high.

What *has* been achieved is keeping the path to 1.5°C open, if only barely, and providing the frameworks and tools that make it still just possible to *Ascend the Summit* within the next 30 years. The 2021 floods in Germany and China, wildfires across Siberia and the Mediterranean, and unprecedented North American 'heat dome' show climate change hitting harder and earlier than previously anticipated, and scientists are painting an increasingly dark picture of the future. But at the same time, solutions have rapidly become cheaper and more easily brought to scale. We are now poised at the threshold of what has to be a radical transformation of the global economy, based on these and other emerging solutions.

We don't know what will happen at the Glasgow Conference of the Parties (CoP26). But whatever happens, it will mark the start of the next cycle of international climate politics – a cycle where:

- We're no longer asking politicians to start a journey, but to up ambition and stay the course.
- New commitments are only as good as the integrity with which they're implemented.
- Climate change could drive geopolitical tensions or stimulate multilateral innovation.
- The action is no longer in formal institutions, but in the networks that spring up between them.

The path to 1.5°C is most likely to stay open if we:

- **Put people at the heart of the transition to Net Zero,** by changing the narrative to one of solutions, success, and inevitability, actively engaging across national, generational, and political divides, and making sure the global low-carbon shift and ancillary race to resilience has more winners than losers.
- **Make Net Zero universal, credible, and inevitable,** with binding targets that cover all emissions, an accelerated shift in the legal, regulatory, and policy landscape, and better carbon pricing and markets.
- **Accelerate delivery in the 2020s** to keep 1.5°C within reach, by delivering on climate finance commitments, finishing the job on shifts already underway, shaping markets to accelerate uptake of low carbon technologies, filling gaps, and regulating new technology.
- **Organize global systems for a low carbon age,** bringing climate institutions together to promote leadership, standards, and accountability, ensuring that climate targets and policies are driven by a full understanding of climate risk and not just mid-range scenarios, making climate core business for every international institution, building solidarity between people and the planet, and investing in resilience and adaptation to a climate changed world.

INTRODUCTION

From the agreement and ratification of the United Nations Framework Convention on Climate Change (UNFCCC) in the early 1990s, international climate cooperation has had distinctive features – and these have intensified over time as the world grapples with supplying "the exemplary public good."

Climate cooperation has challenged governments and international institutions to think, negotiate, and act in very different ways. New types of partnership, alliance, and network have played an increasingly prominent role in efforts to tackle a threat that transcends geographic, sectoral, and temporal boundaries.

Given that climate change can only be tackled through the actions of millions of actors and billions of people, the climate response has also increasingly reached beyond governments and the formal international system. Of the climate institutions created by 2015, only a third were exclusively intergovernmental, with the remainder a mixture of public, civil society, and private.

As a result, climate change has been at the forefront of changing multilateralism, catalyzing a transformation in international cooperation whose speed and nature is underappreciated and poorly understood.

The new model is increasingly networked and inclusive. It embraces cooperation between countries, through the world's multilateral institutions, and across a proliferation of multi-stakeholder initiatives and alliances.

As the threat of a climate catastrophe intensifies – with the Secretary-General describing the latest scientific assessment as a "code red for humanity" – it is easy to miss the speed with which the world has increased its capacity to achieve dramatic reductions in emissions.

In this paper, we use scenarios to demonstrate the impact of international climate cooperation against a counterfactual where there was much less or zero cooperation (as well as showing the additional dividend that would be delivered through more and better cooperation).

We make three core arguments:

1. Thirty years of international climate cooperation have had a significant impact. Without them, the world would be facing even more dangerous near and long-term changes to the climate.
2. This multilateralism is built on a new model, with networked and inclusive forms of collaboration making the greatest contribution to stabilizing the climate.
3. Today's achievements provide a platform for a vital step change in progress, if we continue to innovate in ways that build networks across sectors, institutions, partnerships, and geographies.

ONE
HOW FAR HAVE WE COME?

The metrics of climate change offer nowhere to hide. Global emissions of greenhouse gases have continued to rise – by 1.3% per year in the decade 2009-2018 – despite our growing understanding of the dangers of unchecked warming. As of mid-2021, we have reached an estimated 1.1°C of mean global surface temperature increase since the pre-industrial period.

And the most recent IPCC findings could not be clearer. "Unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach". There is a one in six chance that the remaining carbon budget to stay under 1.5°C has already been exceeded. Even if it hasn't, only another 6-11 years' budget is estimated to remain at current emission rates.

Greta Thunberg lambasted the assembled decision-makers at the 2019 UN Climate Action Summit, saying that "the politics and solutions needed are still nowhere in sight [...] you are failing us". And as the foreword to the IPCC's 2018 special report on 1.5°C warns, whilst "limiting warming to 1.5°C is possible within the laws of chemistry and physics" it "would require unprecedented transitions in all aspects of society". Some argue that the 1.5°C aim of the Paris Agreement is no longer possible.

Have we, in fact, failed to achieve anything over the past 30 years? And are the goals of the Paris Agreement already beyond reach? This section explores the value of action to date on climate change, and what more could be done to avert damaging impacts in three scenarios:

Into the Abyss – looking at impacts and costs if there had been no international action on climate change (a *without measures* scenario).

Base Camp – which assesses where the world is heading based on the latest commitments to reduce emissions (a *current measures* scenario).

Ascend the Summit – which assumes the world acts sooner and more effectively (an *additional measures* scenario).

All three scenarios cover the period 1990-2100. They look at how much temperatures will increase by mid and end-century, how much sea levels will rise by the end of this century and beyond, and estimates of GDP impacts.

The *Into the Abyss* and *Base Camp* scenarios are based on two of the IPCC's core Representative Concentration Pathways (RCPs), which were developed for the Fifth Assessment Report published in 2014 and are "representative of the total [scientific] literature" on climate change. The *Ascend the Summit* scenario draws on an additional RCP that the IPCC devised for its 2018 special report on 1.5°C. All three scenarios include the latest data from the August 2021 Working Group 1 report of the IPCC's Sixth Assessment Cycle.

SCENARIO 1

Into the Abyss – a 4°C+ World

In 1985, scientists discovered the existence of a hole in the ozone layer over the Antarctic. Whilst the effect of CFCs on ozone was theoretically understood, the extent and speed of the real-world damage were a "total surprise". Imagine, for a moment, that the accelerating growth in greenhouse gases since the Industrial Revolution had gone similarly unnoticed, and that today, in 2021, the existence of anthropogenic climate change was suddenly recognized. What kind of world would we be in?

The answer is that we would already have been in a very different, and very frightening world. Drawing on the IPCC's worst case pathway (RCP 8.5), the world would have been on track for up to 2.4°C of warming above pre-industrial averages by mid-century. We would have already crossed the 1.5°C threshold of dangerous warming or would shortly be about to do so. Without the 1987 Montreal Protocol – not originally a climate measure – an additional 1°C of warming could have occurred in the 21st century.

In a world in which climate change had only just been discovered, runaway impacts would be inevitable. By the end of this century, warming could be expected to be between 3.3 and 5.7°C, with a best estimate of 4.4°C – an "inconceivable increase." Sea levels would potentially have risen by more than a meter above 20th century levels and would continue rising for millennia.

Other impacts would include pronounced rainforest dieback in places like the Amazon, up to 80% loss of glaciers in many regions of the world by 2100, and up to 89% loss of permafrost globally this century, with the cumulative release of tens to hundreds of billions of tons of permafrost carbon in the form of CO^2 and methane. This in turn would trigger further climate change.

In this scenario, human life would change unimaginably well before the end of the century. Many coastal cities would experience 'once in a century' storm surges on an annual basis and billions of people would be exposed to extreme heat. The damage to global GDP would be in excess of 30%, with "productivity declining strongly" and damage increasing in a non-linear fashion as temperatures climbed above 2°C.

Would it be too late to constrain runaway warming? Possibly not. But only through an immediate and radical mobilization of all societies – akin to

the social, technological, and economic transformation achieved in some countries during the world wars of the 20th century. Even if governments were willing and able to seize control, they would have scant scientific knowledge, few technical options for restructuring their economies, and none of the frameworks and structures that are needed to underpin collective action. The costs would be even greater than those currently under discussion.

Given what the past decades have shown us about political and institutional inertia – and opposition from vested interests – this scenario would see almost a zero chance of humanity stepping away from the abyss.

SCENARIO 2

Base Camp – Still Over 2°C

We are no longer on a pathway to the world described in *Into the Abyss*. Despite obvious failings, international cooperation has begun to steer us away from this worst case scenario.

The Montreal Protocol, regarded as the most successful environmental agreement in history, demonstrated that international environmental cooperation was possible and had an unexpected positive impact on the climate. Over the following three decades, the 1992 treaty foundation of the UNFCCC, with its two key agreements – the Kyoto Protocol in 1997 and the Paris Agreement in 2015 – put in place an international architecture for tackling climate change and began the work of restraining emissions.

Countries made a first round of Nationally Determined Contributions (NDCs) through a mechanism that aims to ratchet up "aggregate and individual ambition over time." Stronger commitments have been made at President Biden's Leaders' Summit on Climate in April 2021 and ahead of this November's Glasgow Conference of the Parties (CoP26). Emissions grew at 3% per year in the first decade of the 2000s but this slowed to 1% in the 2010s. New commitments, if implemented, have narrowed the 2030 emissions gap to 20-23 $GtCO^2e$.

These impacts are the result of a broader social and economic transformation. Politicians are also starting to realize that people care about the climate, and the 'Race to Zero' is driving major decarbonization efforts across countries, cities, and businesses.

Clean energy prices have tumbled, making renewables cheaper in many cases than fossil fuels. Many of the economic tradeoffs from a decade ago no longer exist. As markets evolve, low-carbon solutions have moved from expensive niche alternatives to competitive alternatives that beat "incumbents on cost, quality, convenience, regulatory alignment or social acceptance." As one analysis notes, market conditions are now brutal for many legacy sectors and technologies.

The impact is measurable, if inadequate. The *Base Camp* scenario is based on the IPCC's RCP 4.5. In this scenario, which assumes that all national climate pledges made to date will be kept in full, we are still on track for an estimated 2.7°C of warming (range: 2.1-3.5°C) by the end of this century. This is 1.7°C below the central projection for the *Into the Abyss* scenario.

The lower end of *Base Camp*'s temperature range is only just above 2°C, which was once regarded as the guardrail for avoiding dangerous levels of climate change. However, this benchmark is now far too high to countenance, with the scientific picture rapidly darkening as research has accumulated, most recently with the initial instalment of the IPCC's Sixth Assessment Cycle.

We are already seeing this darkening of the picture around the world in the shape of more frequent and more extreme heatwaves, wildfires, flooding, and hurricanes, in the loss of glaciers, and in the steady poleward shift in optimal crop zones and distributions of marine species.

In the *Base Camp* scenario, impacts will continue to worsen. Globally, seas are projected to rise above 1995-2014 levels by a median estimate of 0.56 meters by 2100, and 0.93 meters by 2150. Beyond this century, research suggests that each five-year delay in near-term peaking of CO^2 emissions will increase sea levels by around 0.2 meters in the year 2300.

There is high confidence in a 'drastic reduction' in global and African maize crops, with the possibility of tipping points that lead to the collapse of crops in some regions. The Arctic, meanwhile, is 'very likely' to be ice-free in summer, which risks driving other tipping points such as Greenland ice sheet loss and further slowing of the Atlantic circulation system. Permafrost collapse and "rapid and unstoppable sea-level rise from Antarctica" are other potential tipping points.

In this scenario – our current trajectory – we will see more and more 'unprecedented' extreme events. The recent heatwave across Canada and the north-western US is a vivid illustration of such extremes, and of the damage that such unaccustomed heat will do in a world that is 2.1-3.5°C warmer. 'Wet bulb' temperatures (a measure of humidity as well as heat) that are too high for the human body to handle even given shade and unlimited water will become increasingly common, with 2°C of warming projected to lead to up to 1.26 billion person-days/year of exposure across India, Pakistan, and Bangladesh.

The costs of failing to progress beyond *Base Camp* will be immense. In this scenario, global GDP will be reduced by an estimated 10% by mid-century, and 15-25% by 2100.

SCENARIO 3

Ascend the Summit – Heading for 1.5°C

The problem with the *Base Camp* scenario is that it describes progress that is foundational, rather than transformational.

The gains from *Into the Abyss* are both real and substantial – a reduction of nearly 2°C in projected warming by 2100 and a cut to expected economic damage of up to 50%. But global emissions are yet to peak and as the Sixth Assessment Report makes clear, the world now faces pervasive and dangerous climate impacts. For the planet and for billions of humans, a *lesser* catastrophe will still be catastrophic.

But while it is hard to overstate the magnitude of the challenge that lies ahead, our current *Base Camp* is the *only* staging point we have for a further

ascent. Emissions must slow before they can peak and then fall at an accelerating pace. Climate institutions, markets that incentivize a green economy, the declining power of vested interests from legacy industries, a growing public mobilization – all these are the 'equipment' we need to reach the summit.

If we fail to understand the progress that has already been made, more ambitious efforts are unlikely to succeed. The path to 1.5°C is *just* still open but a loss of confidence in multilateral cooperation – encouraged by populists and polarizing forces – could see a critical mass of governments turn backwards just at the point when it is essential that the vast majority of governments act together.

This final scenario – *Ascend the Summit* – describes this next stage, looking at the implications of additional action to help us get as close as possible to the Paris Agreement target of limiting warming to 1.5°C. It builds on the IPCC's most optimistic representative concentration pathway (RCP 1.9).

In this world, we have just 20 years to stabilize the climate, and quite possibly less. Global temperatures have already risen by 1.1°C. In the *Ascend the Summit* scenario, they increase to 1.6°C by 2050 – and then fall to 1.4°C by 2100. To achieve this scenario, countries need to make commitments that will deliver a 45% reduction in emissions between 2010 and 2030. They would also need to make much greater efforts to implement them.

Limiting global warming to 1.5°C above pre-industrial temperatures would still entail damaging consequences by the end of the century, some of which are already being experienced. 1.5°C of warming is predicted to lead to impacts including the loss of 70-90% of coral reefs, 17-44% of permafrost, and a 10% reduction in global maize crops. Sea levels would rise by a median estimate of 0.38 meters by the end of the century and 0.57 meters by 2150, and global GDP would be reduced by an estimated 8%.

However, wet bulb heat stress events across South Asia in a 1.5°C world are estimated at under half those in *Base Camp*. Arctic summer sea ice is 'likely' to be maintained with under 1.5°C of warming. During this century, the economic impacts of 1.5 rather than 2°C of warming have been estimated "to lead to median gains in global GDP per capita of 3.4% and discounted avoided damages of US$36.4 trillion".

There will be substantial co-benefits to this final stage of the journey to tackle climate change, some of which could more than outweigh the related costs of mitigation. One of the key insights from the IPCC's more recent analysis is that the socio-economic features of the pathways we choose matter a great deal for both climate mitigation and climate resilience. More equal societies, with a stronger social contract, greater education and empowerment of women, and higher levels of investment in smaller families play a role in limiting warming to 1.5°C and may be better placed to cooperate internationally.

Summary

These scenarios – summarized in Figure 1 – show that the past 30 years of collective action on climate *have* begun to constrain warming to a measurable and meaningful degree.

Networked and inclusive multilateralism – the plethora of partnerships, networks, and alliances built on the foundation stone of the UNFCCC and the IPCC – has avoided lost lives and costs. Without this action, emissions would have grown even more steeply and we would not even have reached *Base Camp*. The difference between a 2.7°C and a 4.4°C world can be measured in millions of lives and trillions of dollars.

The challenge is to turn foundational change into the transformation needed to keep warming below 1.5°C or as close to this guardrail as possible. In some ways, this challenge has become harder. As the scientific picture darkens and atmospheric space for emissions continues to shrink, we are climbing a mountain that has grown steeper and more perilous.

But it has also become easier – we are vastly better equipped, with many more scalable tools and solutions to hand. What can we learn from efforts to date to tackle climate change? And what elements of these efforts will help us traverse the next stage of the journey, from *Base Camp* to the *Summit*?

FIGURE 1

CLIMATE BREAKDOWN OR BREAKTHROUGH

	+4.4°C BY 2100 **INTO THE ABYSS**	+2.7°C BY 2100 **BASE CAMP**	+1.4°C BY 2100 **ASCEND THE SUMMIT**
	A scenario **without climate action and no effective multilateralism** to tackle climate change	The trajectory with the **latest commitments** to reduce emissions	A scenario where the **world acts immediately** to deliver a 45% reduction in emissions between 2010 and 2030
	Sea-level rises by 0.63 – 1.01 meters relative to 1995-2014	**Sea-level rises** by 0.44 – 0.76 meters relative to 1995-2014	**Sea-level rises** by 0.28 – 0.55 meters relative to 1995-2014
	The world faces a **reduction** of more than 30% in **global GDP** per capita	The world faces a **reduction** of 15-25% in **global GDP** per capita	The world faces a **reduction** of 8% in **global GDP** per capita
	Loss of 49-89% of permafrost globally Much higher risk of extreme sea levels, e.g. **New York City** is predicted to experience sea levels of around 2.75m above normal once a decade versus once a century in a +1.5°C scenario. For a **Pacific island** like Tahiti, extreme sea levels of 1m above normal would happen multiple times each years versus between one in fifty and one in a hundred years in a +1.5°C scenario	Up to 1.26 billion person-days per year of exposure to **deadly extreme heat** across Bangladesh, India and Pakistan The **Arctic** is 'very likely' to be ice-free in summer **Loss of most** coral reefs is 'very likely' High confidence of a **'drastic reduction' in global and African maize crops**, with the possibility of tipping points that lead to the collapse of crops in some regions	Arctic summer sea ice **is 'likely' to be maintained** under 1.5°C **Loss of 17-44% of permafrost** compared to 49-89% in the +4.4°C scenario Limiting warming to 1.5 rather than 2°C could **reduce by 62-457 million the number of people exposed to climate risks and vulnerable to poverty**
	Up to 143 million internal climate migrants across sub-Saharan Africa, South Asia and Latin America by 2050. High level **of physical risk** to financial stability	The 'significant correlation' between temperature increase and crop yield decrease in the Middle East and North Africa could lead to **food price spikes**. Physical and transition **risk** to financial stability	31-72 million internal climate migrants projected across sub-Saharan Africa, South Asia and Latin America by 2050. Lower **physical risk** to financial stability.

TWO
A BRIEF HISTORY OF NETWORKED AND INCLUSIVE MULTILATERALISM FOR CLIMATE

Throughout its history, international climate cooperation has failed to deliver as much or as fast as its proponents might want. Landmark summits have often failed to meet expectations, and talks often threaten to break down before coming up with a weakened agreement that is praised as a "vital first step". But each time the international climate talks have hit a wall, they have regrouped, evolved, and found a new way forward.

This section maps key institutional innovations and the gradual emergence of a networked model that is grounded in evidence, driven by goals and targets, a platform for mutual commitments, and a driver of ambition and action.

I. Knowledge and Evidence

The first feature of this model has been the grounding of climate agreements in knowledge and evidence.

Climate science is now so central to climate diplomacy that it can obscure what a radical shift this marked from traditional patterns of international cooperation. No other global risk has been as extensively studied. While research was initially heavily skewed towards understanding the scale of the problem, solutions have been increasingly explored in recent years. This is an international endeavor, not the work of a nation state, and has been structured to communicate results to policymakers in ways that enable them to take action to generate a complex and intergenerational global public good.

The origins lie in a meeting of physicists, chemists, meteorologists, geographers, and other experts in the small Austrian town of Villach. Scientists from different disciplines had begun to share notes on what they saw happening to the earth's climate. In 1980, the World Meteorological Agency, the United Nations Environment Programme, and the International Council of Scientific Unions convened a panel of experts to undertake the first joint assessment. In 1985, this panel met for the third time and called on governments to build their assessment into all "policies on social and economic development, environmental programmes, and control of emissions of radiatively active gases."

This meeting marked a turning point. What had been a scientific debate began to spill into public consciousness and "lit the fire that awakened the world's governments". This led to the creation of the Intergovernmental Panel on Climate Change (IPCC) in 1990, an institutional innovation that links the state of scientific knowledge to an intergovernmental mechanism. This truly extraordinary body of expertise has since acted as "an anchor" for global understanding of the science of climate change, providing a normative shaping function around ambition and key benchmarks.

On the economic front, the 2006 Stern Review was the first serious attempt to map the global costs of responding to climate change and the economic impact of failing to do so. It came to "a simple conclusion: the benefits of strong and early action far outweigh the economic costs of not acting". Newer studies such as the Global Commission on the Economy and Climate have continued to build consensus on the costs of action and inaction.

More recently, attention has turned to increasingly granular descriptions of how the climate can best be stabilized and resilience built to those impacts which are inevitable. From the UNFCCC's 2019 climate action pathways, to the recent International Environment Agency (IEA) articulation of a net zero pathway for the energy sector, there is increasing clarity about what decisions need to be taken now and what sectoral shifts are needed to move to a zero carbon economy.

The focus on solutions provides practical guidance but it also plays a political role, shifting power from legacy industries – where investors already know what they will lose and have established connections with political elites to protect their interests – towards newer actors in emerging sectors that need to demonstrate the likely growth in their importance to an economy and a society's future.

II. Goals and Targets

Based on this knowledge and evidence, the second feature of this model are the goals and targets that underpin the global climate regime.

Setting an overall goal for climate cooperation was not a simple task. At the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, resistance from the United States to the idea of specific and legally binding mitigation goals meant that the Convention instead agreed to stabilize GHG concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system".

The next step involved moving to a temperature goal. First suggested by the economist William Nordhaus in the 1970s, it wasn't until 1996 that the idea of limiting global temperatures to no more than 2°C above pre-industrial levels was endorsed at the multilateral level by the European Commission (including Angela Merkel as Germany's then Environment Minister). This goal was adopted by the G8 at the 2009 L'Aquila summit, and then the following year by the UN climate process's Cancun Agreements. Cancun also committed to a review of the 2°C target. This review, published in 2015, drew on the latest IPCC science and found the idea of 2°C as a safe guardrail to be 'inadequate', with 'several advantages' to limiting global warming to less than 1.5°C.

Later that year the Paris Agreement's commitment to pursue "efforts to limit the temperature increase to 1.5°C above pre-industrial levels" formalised the shift to a lower threshold for dangerous global warming. The new goal, a longstanding demand of small island states, "dramatically reorganized global thinking around the climate," with the IPCC asked in 2018 to prepare a special report to explore the difference in impacts between these two thresholds and the trajectories that would take the world towards a 1.5°C goal.

The focus has now shifted beyond temperature targets to reaching Net Zero by 2050. From its origins a decade ago, Net Zero was explicitly designed to play a political role as a simple but universal concept that would drive action over electoral cycles (which are short) and investment horizons (which tend to be longer). Despite weaknesses in the way the target is being interpreted – discussed below – the overall impact has been to provide an increasingly detailed map of the path from *Base Camp* to the *Summit* outlined in section 1.

Adaptation to the impacts of climate change that cannot be mitigated is a vital complement to cutting greenhouse gas emissions, given current and inescapable future impacts. The global climate regime has attempted to tackle this more locally specific challenge – and the related question of who foots the bill for climate-related loss and damage – most recently in the Paris Agreement's recognition of adaptation as a global goal. Global adaptation efforts, though, have yet to command the vigor and precision of the multilateral mitigation push.

III. Platform for Mutual Commitments

Thirdly, the international climate architecture has built and refined a series of platforms for mutual commitments.

The first of these happened almost by accident. Before the IPCC was founded and before the Framework Convention was agreed, the world recognized that something needed to be done to limit the emission of ozone-damaging chlorofluorocarbons, or CFCs. The resulting Montreal Protocol, agreed in 1987, forestalled a mid-21st century collapse of the ozone layer that would have led to 1.6 million skin cancer deaths in the US alone. The net economic benefits of reduced UV-B damage to agriculture, forestry, aquatic ecosystems, and building materials were estimated to be $224 billion by 1997.

Montreal also drove an important reduction in two sources of greenhouse gases: ozone-depleting substances and, more recently, the hydrofluorocarbons that initially replaced them. This made it an important first step in tackling climate change, averting what's been estimated as an additional degree of global warming by 2050. Success in Montreal, combined with initial reports from the IPCC, set the scene for the 1992 agreement of the UN Framework Convention on Climate Change. This acknowledged nations' "common but differentiated responsibilities" in preventing dangerous levels of anthropogenic climate change.

For the first two decades of the international climate regime, the emphasis lay more on 'differentiated' than 'common' responsibilities. The Kyoto Protocol, agreed in 1997, set

legally binding mitigation targets for 42 developed and emerging economies. In some senses, Kyoto was a dead end. It took eight years to come into force, failed to secure ratification from the US, and saw Canada walk out in 2012. Setting just one commitment period meant a lengthy further negotiation of a second phase, which was agreed too late to provide certainty for investors. And its blunt distinction between wealthy 'Annex 1' and developing 'non-Annex 1' countries proved to be a crude and sometimes unhelpful precursor to the more nuanced idea of mutual responsibility that eventually underpinned the Paris Agreement.

But Kyoto was also a powerful catalyst for change. It had a broadly positive impact on emission reductions in Annex 1 countries – and may have also influenced non-Annex 1 emissions through spillovers. Subsequent legislation, such as the UK's 2008 Climate Change Act, learned the lesson of Kyoto and set multiple commitment periods from the outset. And the EU was able to make participation in a further Kyoto commitment period conditional on securing all countries' participation in whatever came next.

If Kyoto was a mixed success, the 2009 Copenhagen summit was a huge disappointment. But, like Kyoto, it paved the way for what came next. A global deal that covered all countries and included targets had proved impossible to agree. But a deal that brought everyone in, agreed a headline goal, and provided a framework to ratchet up ambition periodically? That was doable and was, in 2015, what the Paris Agreement pulled off.

This is where a new model of multilateral cooperation comes more clearly into view. The old model was to ask climate experts to conduct negotiations within a formal institutional setting and then hope that real world change would be driven by the global deal they had agreed. What emerged from the ashes of Copenhagen changed this logic. The power of the Paris Agreement is that progress in the real world creates the political conditions for deal-making between governments: international agreements support and accelerate a positive ambition loop but are no longer primarily responsible for driving change.

IV. Driver of Ambition and Action

The fourth main function of the international climate regime has been as an enabler and driver of ambition and action.

To work, the new model relies on networks that can translate commitments into action. The Lima climate summit in 2014, "took an important step in formally recognising the 'groundswell' of climate action by companies, investors, cities, regions and civil society organisations". High ambition alliances – formally constituted or not – are increasingly the place where early pledges are made. Since Paris, there has been a new generation of Net Zero commitments from governments, sectors, and through "a global campaign to rally leadership and support from businesses, cities, regions, investors."

International agreements have changed economic incentives. For instance, the Kyoto Protocol kick-started carbon markets. The EU set up a major emissions trading scheme in 2005 to help reach their obligations under the first Kyoto commitment period, placing around half of emissions across the bloc

under constraint. Despite persistently low prices, the signals that the regime sent about future – tighter – restrictions meant emissions still went down. Today, 61 carbon pricing initiatives cover around 22% of global GHG emissions, with a global value of $277 billion in 2020.

Kyoto also helped catalyze a flowering of clean technology. The number of patents for wind and solar technologies jumped markedly in the decade following its agreement. Born of US and Australian research in the second half of the 20th century, then commercially developed by the Chinese, solar power has grown beyond all expectations. Between 2009 and 2019 the price fell 89%, consistently outstripping international projections and making solar power now the cheapest option for many countries. Battery technology has improved dramatically and prices have tumbled almost tenfold in the past decade, underpinning the accelerating shift to electric vehicles. We're also seeing the first signs of a shift in the sectors that are toughest to decarbonize, with belated action on aviation and shipping, and roadmaps emerging for taking on emissions from heavy industry.

The model must also be inclusive. The United Nations – and not the G20 or Major Emitters Forum – has remained the ultimate decision-making forum for international climate action, enabling small countries facing outsized climate threats to play a role in creating conditions where major emitters are more likely to act. In Durban in 2011, for example, small island states and least developed countries, working with the EU, overcame resistance from India and China to secure commitment to a future agreement that would be legally binding and "applicable to all parties".

Almost 20 years after the original Framework Convention, these four words marked a shift back towards the 'common' in "common but differentiated responsibilities".

The increasingly inclusive nature of the model has also broadened participation far beyond governments. Cities are frequently a source of innovation and can be nimbler than their national leaders: the C40, founded in 2005, now involves 97 cities and a series of issue specific networks. There are now coalitions such as the Climate Ambition Alliance (formed by Chile in 2019) and partnerships that aim to accelerate the phasing out of fossil fuels, such as the Powering Past Coal Alliance. In the finance sector, groups such as the Net-Zero Asset Owners Alliance have emerged, in which over 40 institutional investors with $6.6 trillion in assets under management have committed to achieving Net Zero emissions for their entire portfolios by 2050.

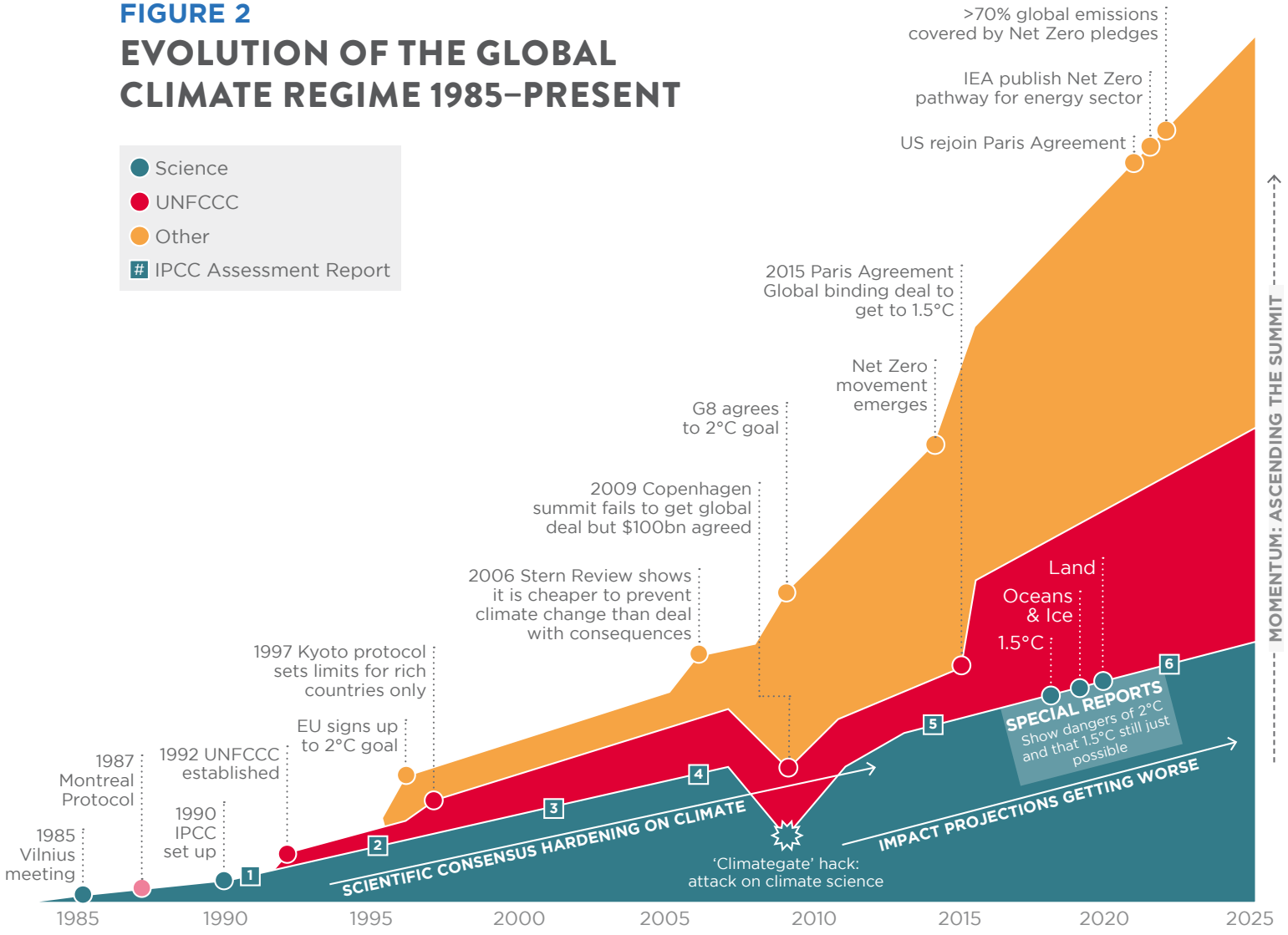
It's not all climate mitigation. As the world struggles to emerge from the COVID-19 pandemic, crisis preparedness is no longer a neglected topic. Multilateral progress on resilience is largely being made outside the auspices of the UNFCCC, through things like the 2015 Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals, and the Secretary-General's recent proposal for an emergency platform to respond to global crises.

Net Zero also seems to be exerting a tenacious hold. In 2019, the UK became the first major economy to enshrine it in law, and as of June 2021, the Climate Action Tracker estimates that 73% of global GHG emissions are now covered by either firm or prospective Net Zero pledges from 131 countries.

This has allowed a redefinition of what ambition looks like. Previous UN Secretaries-General have exhorted the world to act on climate, but mostly in general terms. The current incumbent has a much clearer ask: a global coalition to achieve carbon neutrality by 2050; Net Zero targets to cover at least 90% of emissions; governments to implement commitments that will cut emissions by 45% by 2030; and "every city, company and financial institution to adopt concrete roadmaps with clear intermediary milestones to get to carbon neutrality by 2050."

FIGURE 2

EVOLUTION OF THE GLOBAL CLIMATE REGIME 1985–PRESENT



Summary

This section has shown how, in the decades since international efforts began to understand and tackle the climate challenge, an institutional response has emerged that is networked, flexible, based on strong evidence, and predicated on clear goals. Figure 2 illustrates how a bedrock of growing scientific consensus has underpinned multilateral agreements and, in turn, influenced real-world change.

It has taken longer than anticipated, and at each moment of breakdown or crisis, innovation has been required to maintain engagement and forward momentum and build consensus. But in the Paris Agreement, the world has finally reached a treaty that is legally binding, applicable to all, and includes the aim of limiting global temperature increases to no more than 1.5°C.

The next stage of the journey will be harder. Altering legislation around ozone-depleting substances (and, latterly, their greenhouse gas replacements) made relatively little difference to consumers around the world. And most people are oblivious to whether their electricity supply comes from a coal-fired power station or an offshore wind turbine.

Getting from *Base Camp* to *Ascend the Summit* requires transformational changes, spanning all sectors of the global economy, and most areas of everyday life for people around the world: from diets to transport, and from heating and cooling to consumption and waste management. The final section of the paper looks at how we can build on what has come before, to make this final stage of the journey.

THREE
ASCEND THE SUMMIT

This section asks what the 'recipe' for success might be post-Glasgow. Drawing on the three scenarios and analysis of what networked multilateralism has delivered to date, it looks at how past achievements could drive more rapid and more comprehensive future action to tackle climate change.

As we enter the 2020s, the scale of the challenge remains daunting – and with the COVID-19 pandemic continuing to rage, decision-makers are distracted. On the other hand, solutions have been cheaper and easier to implement than predicted. If we are serious about transforming the global economy over the next three decades to reach Net Zero, while tackling the resilience deficit, we now have many of the tools we need to hand.

We don't know what will happen at the Glasgow summit this November. Many countries have yet to come forward with enhanced national commitments. Climate finance and carbon markets remain contentious. And without equitable access to vaccines, some countries may be reluctant to engage.

But whatever happens, it will mark the start of the next cycle of international climate politics. In this new chapter we're no longer asking politicians to start a journey, but to up ambition and stay the course. New commitments will be only as good as the integrity with which they're implemented. Responses to climate change could drive geopolitical tensions or stimulate multilateral innovation. And the action will increasingly no longer be in formal institutions, but in the networks that spring up between them.

After Glasgow, a successful ascent of the summit requires decision-makers to:

1. **Put people at the heart of the transition to Net Zero,** by changing the narrative to one of solutions, success, and inevitability, actively engaging across national, generational, and political divides, and making sure the global low-carbon shift has more winners than losers.
2. **Make Net Zero universal, credible, and inevitable,** with binding targets that cover all emissions, an accelerated shift in the legal, regulatory, and policy landscape, and better carbon pricing and markets.
3. **Accelerate delivery in the 2020s** to keep 1.5°C within reach, finishing the job on shifts already underway, shaping markets to accelerate uptake of low carbon technologies, filling gaps, and regulating new technology.
4. **Organize global systems for a low carbon age**, bringing climate institutions together to promote leadership, standards, and accountability, making climate core business for every international institution, building solidarity between people and the planet, and investing in resilience and adaptation to a climate changed world.

Put people at the heart of the transition to Net Zero

Net Zero requires countries and most major economic players to undertake a series of integrated, interlocking, and uninterrupted actions over at least three decades. With only partial incentives from the market, the transition will need support over multiple electoral cycles – akin to maintaining a political consensus stretching from Presidents George Bush (senior) to Donald Trump, or Prime Ministers Rajiv Ghandi to Narendra Modi.

Polarization offers a shortcut to disaster. Older forms of resistance – outright denial funded by fossil fuel companies – are in decline, but if COVID-era culture wars alight on 'climate lockdown' as their new call to arms, a new front will open up. The danger will intensify as, over the next generation, we will see the middle classes in huge emerging economies such as China, India, and Nigeria become increasingly vocal and influential swing voters on climate policies.

That's why people must be at the heart of the transition to Net Zero. Only through consistent support from the publics of multiple countries will governments of varying colors stick to the task through all the vicissitudes they will face during (at best) a bumpy period for globalization.

Life is also about to start changing *very* visibly, both in terms of more proximate and visible climate impacts like the recent flooding in Germany and China, but also in terms of increasingly mainstream low-carbon alternatives like solar energy, electric vehicles, and alternative proteins. We will soon discover whether billions of people are able and willing to switch their energy sources, transport choices, diet, and consumer preferences to these greener alternatives.

The architects of the transition to Net Zero need to:

1. **Change the narrative to one of solutions, success, and inevitability**

   If we fuel a mood of crisis and failure, we will destroy hope, create space for populists, and polarize the debate in a way that will strengthen the forces that oppose action. Growing climate impacts could further fuel a 'politics of despair'.

   Instead, stories from trusted messengers as well as data from experts are needed to prove that this is a task that can be and *is* being done, and to help us recognize how far we have already come, so that past successes open a path to further action.

   We need these stories to keep the pressure on while rewarding progress. Young climate campaigners, in particular, need to find a way to win and to celebrate their victories, whilst they continue to push for faster action.

   A narrative is needed that appeals to values and ideas that people find most meaningful, framing climate action as being about jobs, security, pride in place, and better living, as well as protection of the natural world and global commons.

2. **Actively engage with people in all countries, of all ages, and across political divides**

   We cannot allow people to feel that difficult choices are being made for

them and that their futures are being determined behind closed doors by a new global climate elite. To succeed, Net Zero has to be responsive to local contexts and meaningful to people's everyday lives.

It's time to redouble investment in climate assemblies and other participatory mechanisms that give people a sense of agency within an accelerating transformation. Deliberative bodies that are regional and global can help to build consensus that crosses borders. Another challenge will be finding new ways of engaging opponents rather than assuming they can be marginalized and ignored. This will involve swift action to avert resistance to immediate changes – the essential but undervalued work of preventing skeptical positions from hardening or getting people to 'not no' – alongside the longer-term and deeper engagement that builds an emphatic 'yes'.

Countries have multiple priorities and limited bandwidth. Climate change will have to align with other political priorities to build sustainable and powerful coalitions and to effectively manage opposition. In democracies, we need to make sure that voters – both young and old – will require *any* political party that could win an election to support a low carbon transformation.

3. **Design a Green New Deal with many more winners than losers**

Ultimately this is about policies that deliver visibly to people. Workers in declining industries will fight to the last breath unless there's an alternative on the table, and consumers will rebel if short-term costs are too high, whatever the long-term benefits.

Climate justice requires distributional equity – making sure everyone benefits, especially those worst affected or furthest behind – and recognition: acknowledging everyone's right to be heard on the policies that affect them. Getting this right will help keep the 1.5°C pathway open and could (re)build trust in institutions.

COVID recovery packages offer a reset opportunity that hasn't yet been taken. The estimated $380 billion in global clean energy recovery spending is only 2% of the total economic response, and only gets us a third of the way onto the IEA's Net Zero pathway.

Societies also need progressive energy pricing, revenue-neutral carbon taxes, subsidies and rebates that put money back in people's pockets, and financial support that reaches workers not bosses in legacy sectors. This should be coupled with a massive effort to end energy poverty globally and to help people adapt to worsening climate impacts, and comprehensive social safety nets for those who cannot easily adapt to a low-carbon economy.

Make Net Zero universal, credible, and inevitable

Net Zero equipped the international climate framework to drive action in the real world. Its champions promoted it because it was easy to understand,

applicable to all countries and at all levels, and provided the space to plan for a long-term transition.

Enshrined in the Paris Agreement – and combined with a 1.5°C global temperature goal and a mechanism for ratcheting up commitments – the Net Zero goal has set the stage for an era of making commitments and building coalitions. As the Secretary-General has argued, it now has the potential to become "the new normal for everyone, everywhere – every country, company, city and financial institution, as well as key sectors such as aviation, shipping, industry and agriculture."

But this will only happen if we continue to build Net Zero's reach and protect its credibility, at a time when it is criticized by researchers for "serious ambiguity" on what it applies to and is targeted by some campaigners as an excuse for "the world's biggest polluters and governments… to evade responsibility and disguise their inaction or harmful action on climate change."

To make Net Zero universal, credible, and inevitable, we must:

1. **Demand binding commitments that cover all emissions well before 2025**

   If Net Zero is to become and remain the new normal, we need to get commitments for the 27% of global emissions that are not yet covered, ratcheting up the campaign to target holdouts.

   Those that have taken the pledge must extend it beyond just CO^2 to all greenhouse gases. Governments – with the G20 and OECD in the lead – must make commitments legally binding as soon as possible (expanding the current club beyond the EU, Mexico, New Zealand, South Korea, and the UK). All countries should translate commitments into periodic carbon budgets to 2050.

   To avoid greenwashing, all those pledging Net Zero need to be crystal clear about the scope, adequacy, and near-term milestones of their commitment. Businesses and investors need to convert their first wave of pledges into science-based Net Zero targets, which means establishing the framework proposed by the Science Based Targets initiative as the gold standard (or finding an alternative). That could set the stage for a carbon rating system with as much visibility as a credit rating.

2. **Promote an accelerated shift in the legal, regulatory, and policy landscape**

   The campaign to end coal – and the Powering Past Coal Alliance – provide a model for how to drive more immediate milestones that will put us on track to deliver Net Zero goals.

   We now have roadmaps from the IEA and others that helpfully set hard deadlines such as no sales of new fossil fueled boilers from 2025, all new buildings to be ready for zero carbon by 2030, and an end to the sale of internal combustion engine cars from 2035.

   After Glasgow, we need an agreed menu of these milestones, frameworks for delivering each of them, and high ambition alliances that allow countries to move together in lockstep (or face pressure if they fail to do so).

Crucially, countries must believe better governance of climate transitions will be rewarded in financial markets.

3. **Price carbon and get carbon markets right**

   In 2019, just 5% of emissions were covered by a carbon price that is high enough (a price that needs to increase towards $100 by 2030), while the failure to cooperate in building carbon markets is leaving a massive dividend on the table ($250 billion in 2030).

   If Glasgow resolves the remaining rulebook questions, there will be an explosion in trading. We need targets to price a growing proportion of carbon, markets that offer high-quality credits, and rules and oversight mechanisms that stop countries and companies buying their way out of making (hard) decarbonization choices.

Accelerate delivery in the 2020s

The first half of the 2020s will be about keeping the door to 1.5°C ajar and building resilience to those climate impacts that cannot be mitigated. Without massive action this decade, we risk burning through the remaining carbon space well before 2030, while the increasing gap between those most and least able to cope with climate impacts – illustrated by uninsured losses in developing economies – could become a threat to multilateralism.

Glasgow must mark a switch to a more granular focus on the transitions that will keep Net Zero on track, using the full range of tools to shape the markets that will increase the uptake of existing technologies and bring new ones online. This requires cross-sectoral governance for economic systems reform. The biggest barriers to rapid clean technology deployment are no longer cost but alignment of 'horizontal' policies – such as public investment, decentralization, market regulation, infrastructure planning, and industrial, labor, and competition policy – with climate action.

We must also build foundations this decade for the decarbonization of the 2030s, filling in technology and infrastructure gaps and preparing to manage geoengineering.

To accelerate delivery in the 2020s, we must:

1. **Finish the job on shifts already underway**

   The energy transition is happening. Since 1980, low carbon energy (renewables plus nuclear) has nearly doubled to just under 16% of global supply, and in Iceland, it's already as high as 79%. But globally, low carbon alternatives are struggling to do more than keep up with expanding demand.

   To displace fossil fuels in line with a Net Zero pathway, we need "immediate and massive deployment of all available clean and efficient energy technologies." Solar is cheaper than oil or gas in most countries, but we still need to incentivize uptake, avoid lock-in, and tackle inertia. Those countries of the Global South currently dependent on fossil fuel use and revenues will particularly require support to move

to a low-carbon economy. This is a major opportunity, but needs careful management to ensure that those currently without energy access are not left further behind.

The world also needs to finish the exit from coal, and drastically cut reliance on unabated oil and gas. Recent experience shows that the barriers that sustain fossil fuel subsidies can be tackled by staggering reforms, supporting those hardest hit, and using new revenues for other public goods.

2. **Shape markets to accelerate uptake of low carbon technologies**

Net Zero will only be possible with a dramatic increase in the use of electricity for transport, industry, and heating.

Electric passenger vehicles accounted for just 5% of new car sales in 2020, but are set to reach price parity by 2024, largely thanks to tumbling battery prices. Uptake will depend on government regulation to outlaw new internal combustion engine vehicle sales (the IEA suggests from 2035), the availability of charging infrastructure, and local measures such as low emission zones in cities.

We also need an accelerating shift in diets in the 2030s. Alternative proteins are taking off and could be five times cheaper than animal protein by 2030, but will require increased R&D, policy support – including repurposing agricultural subsidies – and campaigns to change behaviors. A "strong, rapid and sustained" push on methane abatement and other short-lived climate pollutants such as refrigerants is also needed and could yield relatively quick impacts on temperature rises.

The reduction of ozone-depleting substances provides a useful example of the interplay of technical (substitute gases), regulatory (increased efficiency) and design (a 'passive first' approach to cooling) initiatives to successfully shift manufacturing and consumer behavior.

3. **Fill technology and infrastructure gaps - and regulate new tech**

Technological breakthroughs are needed in hard-to-abate areas such as heavy industry, shipping, and aviation.

Cost-effective green hydrogen for aviation and shipping fuel will depend on cheaper electrolyzers. Long-haul trucking will need advanced battery technology. This transition – and the ancillary infrastructure (pipes, ports, storage) – will demand "immediate and forceful [joint] action" between governments, investors, and industry.

Carbon capture and storage may be needed to 'mop up' residual emissions under some mitigation scenarios. With some countries already attempting to block global regulation of other forms of geoengineering, multilateral efforts will be needed to manage risks and avoid a rush towards unilateral deployment.

Organize global systems for a low carbon age

The last 30 years have built an institutional architecture to tackle climate change. The next 30 will be about using this architecture to deliver results. We cannot afford to spend time arguing about major governance reforms. But – as networks proliferate – we must get better at managing complexity, while ensuring that the existing system evolves to tackle new demands, and making climate core business for all parts of the international system.

The Paris Agreement will continue to be the hub of an ecosystem of institutions driving the transition to Net Zero, while specialized institutions and agencies such as the IPCC and WMO act as valuable 'tug boats', doing one necessary thing well. While these universal bodies represent the interests of 8 billion people, nimbler groupings such as the G7, G20, and Major Emitters' Forum will be the main source of political leadership. Informal coalitions will continue to be the place where ambition can be built, even if it is only member states that can ultimately deliver.

Climate change will be an increasingly important driver of geopolitics in the coming decades. Rising climate impacts and the knock-on effects of the renewable energy and electric vehicle revolution will change the balance of global power, while major powers will inevitably clash if they believe others are reneging on their climate commitments. In the worst case, this could undermine the economic integration needed to drive rapid decarbonization and the broad cooperation needed for resilience.

To organize global systems for a low carbon age, we need to:

1. **Bring climate institutions together to promote leadership, standards, and accountability**

   Whether or not Glasgow is declared a success, global and national climate leaders must work together to maintain ambition, oversee delivery, manage frictions, and set out a detailed roadmap beyond 2030.

   There is no time for each country to develop its own approach to delivering decarbonization and resilience from scratch. Core business for the international system will be to bring all the actors to the table who can put us on track to meet Net Zero, develop standards for the low carbon age, manage new challenges such as carbon border adjustments, and support resilience efforts.

   And as it becomes increasingly urgent that major emitters meet their mitigation commitments, international organizations must become a growing source of accountability for those who do not. These accountability mechanisms must keep pace with the ratcheting up of climate ambition.

2. **Make climate core business for every international institution**

   Shifting gears on climate ambition will depend on strong geopolitical alliances. Equally, we cannot afford a world in which climate policy becomes the locus of great power competition. Above all, the US and China will need to find common cause, transatlantic relationships must support increased ambition,

and the promised $100 billion in annual climate finance and other support for resilience will be needed to support North-South relations on climate at a time when they are strained by COVID-19 inequities.

As well as managing their own climate risks, international institutions will need to help member states navigate these geopolitical tensions, while increasing coherence across international regimes for trade, food, finance, and other areas. To promote this coherence, the Secretary-General – working with the heads of the UNFCCC, IMF, the World Bank and other development banks, WTO, G7, and G20 – could set three broad missions for all parts of the international system.

First, tackle geopolitical risk, by managing the security implications of a changing climate, minimizing competition over the 'right' to emit, and stopping great power competition from undermining climate cooperation.

Second, put climate at the heart of the global prevention agenda, by assessing and mitigating risks across all sectors and geographies, and using lessons learned from COVID-19 to promote much greater ambition on resilience.

And third, future-proofing financial, investment, and regulatory decisions – from building codes to health, and from agriculture to taxation – by thinking first about climate. In particular, we need to align financial and economic institutions – such as the IMF, WTO, international development banks, and international standards organizations – to deliver Net Zero.

3. **Build solidarity between people and the planet**

In tandem with the climate crisis, the planet is also facing the consequences of other boundary breaches: from biodiversity to chemical pollution, and from land system change to nitrogen and phosphorus run-off. One in eight plant and animal species face extinction. The UN Secretary-General has warned of our "senseless and suicidal … war on nature".

We can no longer afford to divide the climate from the rest of the environment. All roads to Net Zero rely on ecosystems to act as carbon sinks and to help people cope with climate impacts. And action on climate also drives improvements in local air, water, and soil quality that have an immediate and tangible impact on people's lives.

Ending the planetary emergency requires a commitment to "a green transition, environmental and intergenerational justice, and young people as designers of a sustainable future." That requires framing environmental priorities within a comprehensive effort to reimagine the social contract, while using the international system as a platform to speak for the rights of young people and the 10+ billion people still to be born this century.

CONCLUSION

The IPCC's latest report leaves no room for doubt about the causes, pace, and likely consequences of climate change. Without immediate action, we will see temperatures rise steeply by the end of this century. Our grandchildren and great-grandchildren will inherit a world beset by fire, flood, drought, starvation, conflict, and mass migration.

But as this report has shown, we *have* begun to act. The past 30 years have seen unprecedented cooperation to build the scientific evidence, agree a global goal, design governance systems that can ratchet up ambition in line with the science, and drive the technological advances we now need to deploy at scale.

This multilateralism is built on a new model, with networked and inclusive forms of collaboration making a substantial contribution to stabilizing the climate. We now have an institutional architecture that provides the foundations for delivering transformational impact in the next decade and beyond.

Network and inclusive multilateralism has already bent the curve – from what could have been 4.4°C of warming by 2100, to the current best estimate of 2.7°C. And whilst the latest IPCC report makes for extremely difficult reading, the next stage of climate action – the climb towards 1.5°C – is one we have spent decades equipping ourselves to make.

We have to make the 2020s count. That means understanding how the new model of global climate cooperation works and how to use it to drive faster action. The basic ingredients remain essential: driving ambition through evidence and data, goals and targets, mechanisms for making mutual commitments, and an ecosystem of partnership and alliances that translate these commitments into change in the real world.

But the Glasgow climate summit must be used to promote the model's further evolution. Hardening Net Zero by making it universal, credible, and inevitable, but softening it to speak to people's needs and aspirations. Accelerating delivery through increasingly granular roadmaps, while tackling the 'big picture' challenge of building global institutions for a low carbon age.

In the old joke, a traveler stops to ask a farmer for directions and is told, "I wouldn't start from here." Too much advocacy on climate has this joke as its organizing principle. But we can *only* start from here, from the base camp that it has taken 30 or more years to reach, and through an ascent to the summit that harnesses networks of innovation that stretch across sectoral silos, institutional boundaries, and the world's increasingly complex geographies.

As the threat of a climate catastrophe intensifies – with the Secretary-General describing the latest scientific assessment as a "code red for humanity" – it is easy to miss the speed with which the world has increased its capacity to achieve dramatic reductions in emissions.

In this paper, we use scenarios to demonstrate the impact of international climate cooperation against a counterfactual where there was much less or zero cooperation (as well as showing the additional dividend that would be delivered through more and better cooperation).

We make three core arguments:

1. Thirty years of international climate cooperation have had a significant impact. Without them, the world would be facing even more dangerous near and long-term changes to the climate.
2. This multilateralism is built on a new model, with networked and inclusive forms of collaboration making the greatest contribution to stabilizing the climate.
3. Today's achievements provide a platform for a vital step change in progress, if we continue to innovate in ways that build networks across sectors, institutions, partnerships, and geographies.

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