

**COP26  
PRESIDENCY  
UK 2022**

**DELIVERING THE  
GLASGOW CLIMATE PACT**

**RESEARCH AND  
KNOWLEDGE TO  
ADVANCE GLASGOW  
COMMITMENTS**





# FOREWORD

**In November 2021, the UK hosted COP26 in Glasgow. The conference was a time for countries to update commitments given in Paris, with leaders accelerating their ambitions for a resilient, net zero future. 153 countries, covering 80 percent of the world's greenhouse gas emissions, put forward new or updated emissions targets for 2030 known as Nationally Determined Contributions (NDCs). 90 percent of the world's GDP is now covered by commitment to reach Net Zero by mid-century. As part of the Glasgow Climate Pact, countries agreed to revisit and strengthen their current NDCs in 2022, which will be critical to ensure pathways to net zero are compatible with limiting global temperature rise to 1.5C.**

Science diagnosed climate change and, over the past 30 years, the Intergovernmental Panel on Climate Change (IPCC) has carefully built the evidence that 1) the climate is changing, 2) it is unequivocally due to human activity and 3) limiting global warming to 1.5 degrees will significantly

reduce impacts. This acquisition and sharing of knowledge is a phenomenal achievement and the result of diligent, sustained efforts from many researchers from around the world that have helped us to understand the problem.

The scale of the climate crisis we face has serious consequences for life on the planet. Our attention must move to delivering the transformations necessary at every level of society. Individuals, employers and institutions will have to work in concert to achieve net zero and adapt. Researchers, innovators and engineers will play a critical role in rapidly deploying solutions that are ready now, while accelerating the pace of research and development where deployable solutions are not available. We must begin to think globally, ensuring climate solutions are accessible to all and their benefits shared fairly. **We must be bold and act now if we are to keep the hope of limiting global temperature rise to 1.5 degrees alive.**

The great privilege and responsibility of the COP26 Presidency is to be able to offer a tremendous opportunity to catalyse such concerted global action. During its presidency, the UK is focusing on four goals: 1) ensure all Nations are

on a path to achieve global net zero by mid-century; 2) protect people and nature through adaptation; 3) mobilise finance to tackle climate change; and 4) work together, encouraging cooperation across borders and society.

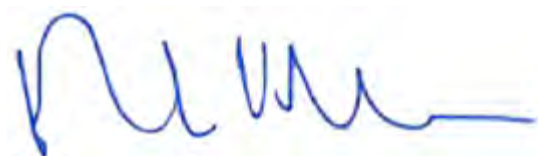
At Glasgow, countries made ambitious commitments to support these goals. Countries expressed determination to work together internationally to make faster progress. For example, leaders of over 42 countries launched the [Glasgow Breakthroughs](#): committing to collaborate on making clean technologies and sustainable solutions the most affordable, accessible and attractive option in each emitting sector of the global economy, before the end of this decade.

In a pre-COP26 [statement](#), international senior scientific advisers emphasised that successfully mitigating climate change will require intense international collaboration on research and innovation to develop and deliver new solutions across all sectors of the global economy. Developing long-term strategies to meet newly made net zero commitments requires academic and technical support for developing pathways and sectoral policies, and meeting technological, socio-economic and financial requirements. Increased international collaboration among the research, innovation and engineering community, including through global, representative scientific organisations such as the International Science Council, can further accelerate the pace of research, development, demonstration and deployment of effective mitigation and adaptation solutions, in a locally appropriate manner, informed by those most affected.

Science and Innovation was a key theme at COP26 – promoting the importance of science in not only understanding climate change, but also in delivering solutions to this crisis. The transformation needed to reduce emissions, limit global temperature rise and adapt to changes already locked in, will require rapid societal and technological innovation across the globe. Together, we will be better equipped to realise these four goals of COP26 and speed up the transition to resilient, net zero societies.

This document does not attempt to provide an exhaustive list of the areas where researchers, innovators and engineers can support implementation of the key commitments made by countries in Glasgow. There will be important work in a range of fields not mentioned below that contributes to the overall evidence base. However, the document does include a number of important topics – identified by consultation between the COP26 Presidency, policymakers and researchers worldwide – where new knowledge, understanding and expertise can help policymakers.

I look forward to working with you all, as we transform commitments into action.



**SIR PATRICK VALLANCE**  
**UK GOVERNMENT CHIEF**  
**SCIENTIFIC ADVISER**



PETRUS ASUY SOWS FOREST CROPS SEED IN HIS NURSERY IN MUARA TAE VILLAGE, EAST KALIMANTAN PROVINCE OF INDONESIA ON SEPTEMBER 2015.

# 1. INTRODUCTION

PHOTO BY PHOTOGRAPHER MICHAEL EKO / CLIMATE VISUALS  
COUNTDOWN / CREATIVE COMMONS

**We are calling on researchers, innovators and engineers from all disciplines to mobilise knowledge and expertise to support the commitments made at COP26.**

The four [goals](#) of the UK's COP Presidency cover **mitigation, adaptation, finance and collaboration**:

- Secure global net zero by mid century and keep 1.5 degrees within reach
- Drive adaptation action to protect communities and natural habitats
- Mobilise climate finance
- Work together to deliver

The Glasgow summit made good progress on all of these goals. Ahead of COP26, 127 new or updated Nationally Determined Contributions were submitted to the UNFCCC, covering 154 Parties, and more than 90% of world GDP is now covered by net-zero commitments. The new Glasgow – Sharm el-Sheikh Work Programme will drive adaptation action. The \$100 billion goal will be reached by 2023 at the latest, and it is likely that \$500bn will be mobilised between 2021-2025.

Three sector-specific COP26 priorities are ending coal power, preventing deforestation and accelerating the rollout of electric vehicles. The conference brought new commitments from governments, business and civil society to pursue these priorities. For example, countries that encompass more than 90 per cent of the world's forest area have now committed to halt and reverse deforestation by 2030. \$12 billion of public funds were committed to protect and restore forests. At the conference, more than twenty countries committed to phase out coal power, including some of the world's largest coal users. \$7.2 billion of private investment and thirty-four countries signed up to end international financing of fossil fuels by the end of 2022. The [Glasgow Climate Pact](#) describes the commitments made at COP26 in full.

**Now we must move fast to put these promises into action.**

This document sets out where knowledge and expertise can help to realise the COP26 commitments, in particular by supporting national and sub-national governments, along with companies and other non-state actors.

Researchers, innovators and engineers have of course led the way in understanding and tackling climate change, and this document is not intended to be an exhaustive list of actions needed to reach a resilient net zero future. Instead it highlights topics that are a particular focus of COP26. These have been selected in collaboration with the International Science Council and researchers from around the world.

Some of these topics are where additional research is needed to support action. Funding bodies and senior academics can help by making these priority areas of research and innovation.

Other topics we identify are where existing knowledge can be mobilised: brought to the attention of key decision makers and institutions so it can be put into action. We make some suggestions on how to do this in part 5, including forms of collaboration to ensure insights, expertise and knowledge reach those ready to take ambitious climate action.



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BATTERY POWERED  
HOSPITAL TROLLEY  
DELIVERING SUPPLIES.



## 2. MITIGATION

PHOTO BY PHOTOGRAPHER PAUL STARKEY / ASHDEN / CREATIVE COMMONS

### **SPEEDING UP THE SWITCH TO ELECTRIC VEHICLES**

The switch to zero emission vehicles is accelerating, but we need to go faster.

#### **COMMITMENTS**

Under the COP26 Declaration on Accelerating the Transition to 100% Zero Emission Cars and Vans, more than 35 countries, along with 43 cities, states and regions, and 6 major vehicle

manufacturers, committed to working towards all new car and van sales being zero emission by 2040 globally and by 2035 in leading markets.

Countries with a national level

The COP26 Presidency is targeting systems transitions in three high-emitting sectors: land use, transport and energy. As well as bringing direct benefits for mitigation, plurilateral engagement in specific sectors demonstrates that meaningful action towards net zero is viable.

commitment or proposal to end the sale of polluting vehicles now account for 20% of the global car market, up from 5% in 2019. The manufacturers that are committed to stop making fossil fuel powered vehicles now represent more than 30% of the global market, up from near-zero at the beginning of 2021.

## **EVIDENCE NEEDS AND KNOWLEDGE GAPS**

### **Information to support governments in driving this transition**

- How best to design standards, policies, and long-term regulations to support an accelerated transition to zero emission vehicles
- Evidence on the economics of various zero emission vehicle (ZEV) transition pathways to inform financial investments
- How to support a circular economy for vehicles and batteries, for example through regulations on recycling and retrofitting
- How best to prevent dumping of ICE vehicles in emerging and developing markets as a result of EV transition in major, developed markets

### **Information to support vehicle manufacturers in a sustainable transition**

- Increased understanding of the industrial system around road transport, including emissions associated with mining and refining, and battery decommissioning

- Research and innovation to address key challenges of battery technology to increase uptake of ZEVs. For example: reduced cost, increased energy density (driving range), longevity, sustainability, scalability, fast charging (10 to 15 minutes), advances in battery management software and hardware, new methods of manufacture and technology transfer
- Research and innovation in power electronics, electric motors, drivetrains, digital technology
- Technical development of ZEVs, including the potential for innovation to drive accelerated transition pathways
- R&D on hydrogen fuel cells
- R&D on technology options for decarbonising heavy goods vehicles, trains, shipping and aviation

### **Systems thinking and holistic approaches to improve uptake and efficacy of ZEVs**

- Integrating green transport into the wider energy system, for example combining transport and grid networks: using EVs to store electricity and balance the power grid
- Embedding electric vehicles in the next generation of mobility, for example improving urban mobility and planning with net-zero public transport systems
- Incentivising the roll out of fast charging infrastructure, and future proofing the network for

a new generation of even faster charging EVs

- Equity in access to charging facilities
- The sustainability of electric vehicles and infrastructure, from environmental, economic and social perspectives, to avoid unintended consequences such as those from cobalt mining for batteries
- How countries can leapfrog in the transition, including the role of knowledge sharing and collaboration
- The air quality implications and health co-benefits of different ZEV technologies



*Despite widely acknowledged benefits of transportation electrification, significant challenges remain regarding infrastructure, financing, operations, and business models. We need impact-oriented researchers to step up to the challenge by applying cutting-edge techniques to practical problems and accelerating the technology-to-market process.*

#### **DR ANN XU**

RESEARCH SCIENTIST AT TEXAS A&M UNIVERSITY TRANSPORTATION INSTITUTE AND CEO OF ELECTROTEMPO, INC.



## **HALTING AND REVERSING FOREST LOSS AND LAND DEGRADATION**

Protecting, conserving and restoring ecosystems, and managing land sustainably, has the potential to reduce annual net greenhouse gas emissions by more than 7 gigatonnes of CO<sub>2</sub> by 2030. It would also support adaptation, reduce climate vulnerability, promote biodiversity, and enhance livelihoods.

To achieve all this, we need to halt and reverse forest loss and land degradation, and conserve other ecosystems like coastal wetlands and peatlands. We must also shift towards truly sustainable agriculture and food systems, which support nature, climate and people. These interventions should be implemented with the full involvement of local communities, and in a way that also measurably enhances biodiversity.

### **COMMITMENTS**

142 countries, containing more than 91% of the world's forest area, committed to halt and reverse forest loss and land degradation by 2030 in the Glasgow Leaders' Declaration on Forests and Land Use.

28 countries launched a roadmap to protect forests through a global shift to sustainable development and trade in agricultural commodities, through the Forest, Agriculture and Commodity Trade Dialogue and its Roadmap.

16 countries endorsed the Policy Action Agenda for Transition to Sustainable Agriculture, which sets out how countries can repurpose policies to enable a just rural transition.

30 financial institutions, representing

\$8.7 trillion in assets, committed to eliminate investment in activities linked to agricultural-commodity-driven deforestation.

### **Funding was also promised.**

12 developed countries pledged \$12 billion of public climate finance from 2021 to 2025 to a new Global Forest Finance Pledge.

12 country and philanthropic contributors pledged at least \$1.5 billion to protect the forests of the Congo Basin.

14 country and philanthropic donors pledged at least \$1.7 billion from 2021 to 2025 to advance forest tenure rights of indigenous peoples and local communities, and to support their role as guardians of forests and nature.

In addition, at least \$7.2 billion of private sector funding was mobilised at COP26.

## **EVIDENCE NEEDS AND KNOWLEDGE GAPS**

### **Further understanding the benefits of avoiding nature loss and degradation**

- Mitigation potential of protecting ecosystems, including future carbon sequestration potential of forest, peatland, grassland and mangroves at risk from human and climate driven degradation
- Climate change adaptation benefits of protecting ecosystems
- Synergies and potential conflicts between nature-based climate change and biodiversity goals
- Quantifying a range of ecosystem services, including current carbon stocks

- The resilience to climate change of carbon stocks held in vegetation and soil in different ecosystems
- Deforestation rates under various land ownership models, including by indigenous peoples and local communities
- Monitoring, reporting and verification (MRV) frameworks to establish baselines and to measure progress

### **How to achieve ambitious biodiversity targets**

- Spatial information on biodiversity, carbon and ecosystem services, with enough detail to support meaningful economic policy and land use planning
- Agreed metrics to assess biodiversity status and measure changes
- Drivers of biodiversity loss, including deforestation, intensive farming and poor agricultural management
- Efficacy of different approaches to tackle biodiversity loss, including protected areas and wider landscape approaches, and how to build resilience to climate change within these approaches
- Tools to assist in biodiversity protection. For example, data from satellite monitoring to aid in restoring degraded ecosystems and improve connectivity across landscapes



MAN WEARING A FILTERING MASK, SANDING BY HAND A LARGE WIND TURBINE BLADE IN A FACTORY.

PHOTO BY PHOTOGRAPHER JOAN SULLIVAN / CLIMATE VISUALS COUNTDOWN / CREATIVE COMMONS

### How to improve finance for nature, and integrate nature into economic decisions

- The economic benefits of sustainable land use (job creation, revenue, added value, reduced emissions), and protection of biodiversity and human and animal health
- Using natural capital accounting to allow ecosystem service impacts to be bundled or stacked for financing of nature-based solutions
- Economic valuation of emissions and degradation of ecosystem services from poor agricultural management and deforestation



*Eliminating tropical deforestation is the quickest and cheapest way to reduce greenhouse gas emissions. Research and evidence in this area can demonstrate the many co-benefits of this to our society, including the ecosystem services forest provide to our society, such as regulating the hydrological cycle.*

**PROFESSOR PAULO ARTAXO**

INSTITUTE OF PHYSICS, UNIVERSITY OF SAO PAULO



### GOAL TO CLEAN POWER

The power sector accounts for a quarter of global greenhouse gas emissions, and coal is the single biggest contributor to human created climate

change. Keeping 1.5°C alive requires rapidly halting construction of new coal power plants, scaling up clean power and retiring existing coal fleets

(in advanced economies by 2030 and globally by 2040). The UK Presidency has prioritised ending unabated coal power, as the most polluting fossil fuel, while increasing international support for countries to scale up clean power.

## COMMITMENTS

Countries made specific commitments to support this objective. From ending construction of, and funding for, coal power plants, to promoting clean energy, and promoting a just transition.

Building on the [Powering Past Coal Alliance](#) (PPCA), 65 countries have now committed to phase out coal power, including more than 20 new commitments at COP26. Forty-eight countries, 48 subnational governments and 69 organisations are now [members](#) of PPCA.

All major coal financing countries have committed to end international public coal finance by the end of 2021. Thirty-four countries and five public finance institutions committed to end direct international public support (currently around \$24 billion annually) for the unabated fossil fuel energy sector by the end of 2022.

More than \$20 billion of new public and philanthropic finance has been committed to strengthen international financial and technical assistance for countries to scale up clean power and move away from coal. This includes through the [Energy Transition Council](#) and the \$8.5 billion South Africa Just Energy Transition Partnership.

35 countries also signed up to the international Just Transition Declaration, committing donor

countries to supporting just transitions internationally with their international climate and broader funding streams.

## EVIDENCE NEEDS AND KNOWLEDGE GAPS

### Further R&D on technology to accelerate the transition to clean power

- Transformations in electricity storage to support a decarbonised power sector, including research and innovation on power-to-hydrogen
- Short-term storage to deliver stable voltage and frequency in a highly decarbonised grid
- Digital technologies to model, control and optimise a decarbonised power grid

### Identifying levers to eliminate fossil fuel finance as soon as possible

- Research into drivers of demand for financing the fossil fuel energy sector, to identify mechanisms and incentives for financiers to move away from fossil fuels
- Strengthening the evidence base for economically viable alternatives to fossil fuels
- Knowledge on just and viable pathways to reduce fossil fuel finance

### Evidence on opportunities from, barriers to, and trade-offs in the clean power transition

- Economic, health, social and biodiversity co-benefits of the move to clean energy
- Coal phase-out pathways,

specifically for major coal-using economies, and technical solutions for renewable deployment (e.g. grid integration)

- How to reduce barriers to, and increase enablers of, the power sector reforms required for energy transitions
- Strengthening the case for shifting away from coal as fast as possible, for example the impacts of continued coal consumption on air quality, health and the environment
- Analysis of the relationship between accelerated energy transition and energy security, including opportunities and challenges
- Mapping of subnational concentration of coal power in coal-intensive economies, and how key subnationals and domestic banks can support coal phase-out

### How to build all-of-society approaches to transitions from coal

- Risks and challenges of the just transition, ensuring they are incorporated in finance models
- Setting technological approaches in a societal context to create transformative solutions that address underlying vulnerabilities and inequalities
- Forecasts of the long-term job impacts of the energy transition, and how to stimulate more job creation through local infrastructure and development




*The great value of (social) research in supporting a Just Energy Transition is that it reveals the impact that the energy transition will make in ordinary people's lives and how this impact could be a positive one if their voices are included in the planning for this transition, so as to leave no one behind.*

**DR. NTHABISENG MOHLAKOANA**

SENIOR RESEARCHER, CENTRE FOR SUSTAINABILITY TRANSITIONS (CST), STELLENBOSCH UNIVERSITY



A photograph of Clare Mukankusi, a woman with braided hair, wearing a light-colored jacket and a beaded necklace, standing in a lush green bean field. She is looking down at a bean plant. The background is filled with rows of bean plants supported by wooden stakes.

CLARE MUKANKUSI,  
CIAT BEAN BREEDER  
IN KAWANDA, UGANDA,  
LEADS BREEDING  
EFFORTS FOR THE  
BEAN GENE BANK.

# 3. ADAPTATION, LOSS AND DAMAGE

PHOTO BY PHOTOGRAPHER  
GEORGINA SMITH / CIAT /  
CREATIVE COMMONS

## COMMITMENTS

At COP26, countries agreed to the Glasgow – Sharm el-Sheikh Work Programme on the Global Goal on Adaptation. This two-year programme will deliver action to reduce vulnerability, strengthen resilience and increase the capacity of people and the planet to adapt to the impacts of climate change.

People across the world already live with the devastating consequences of our changing climate, through extreme weather and slow-onset events. Rising seas and changing weather patterns threaten the lives and livelihoods of millions. Even with deep reductions in greenhouse gas emissions, further change is inevitable.

Parties at COP26 also agreed to develop over the coming year the institutional arrangements for the Santiago Network for loss and damage, which will include funding for technical assistance to developing countries. In addition, a new 'Glasgow Dialogue' was agreed to discuss arrangements for long-term funding for loss and damage.

Other commitments on adaptation that were made, or updated, for COP26 will:

**Improve countries' ability to plan for adaptation.** Over 80 countries are now covered by either adaptation communications plans or national adaptation plans to increase preparedness to climate risks, with 45 submitted over the last year

**Enhance countries' ability to take effective action.** The new [Adaptation Action Coalition](#) brings 40 countries together to share knowledge and find solutions to some of the most challenging impacts of climate change. The Champions' [Race to Resilience](#) campaign launched a metrics framework that, for the first time, allows cities, regions, businesses and investors to measure the progress of their work in building resilience to climate change for the 4 billion people most at risk by 2030. The [Adaptation Research Alliance](#), a new global network of over 100 organisations across 35 economies, will see governments, businesses and local societies increasing the resilience of vulnerable countries, putting indigenous knowledge and solutions at the core of its work.

**Ensure adaptation finance is available to those who need it.** Over \$350 million was committed to the UNFCCC

Adaptation Fund at COP26: nearly triple the previous highest collective mobilisation. Over \$600 million was pledged to the Least Developed Countries Fund, the highest collective mobilisation the fund has seen. The European Commission, Belgium, Italy, Australia, New Zealand and African Development Bank joined the Champions Group on Adaptation Finance, and are all committed to achieving a balance in climate finance between adaptation and mitigation. Collectively, the Champions Group on Adaptation Finance is projected to provide around \$12.7 billion in adaptation finance in 2025.

## EVIDENCE NEEDS AND KNOWLEDGE GAPS

**Translating climate risk information and research so that it can be used to support national and local adaptation planning and investment in priority projects**

- Tools for making decisions under uncertainty of future climate impacts, such as AI for climate modelling and early warning systems
- High-quality local, regional and global projections of median trends and extremes, disseminated through easily accessible products such as the Kenya Climate Atlas
- Knowledge that integrates adaptation to climate change, risk reduction and biodiversity loss and incorporates nature based solutions
- Tools to support planning of

projects and programmes on the basis of low-regrets action, where downscaled climate modelling is unavailable

### **Early and anticipatory approaches to the impacts of climate change**

- Next generation climate and weather models to provide detail on local climate impacts
- Improved process understanding to reduce uncertainties in the magnitude of climate change for particular emissions scenarios, to better target adaptation investment
- Improved understanding of ice sheet processes to narrow the range of long-term sea level projections, to better target adaptation investment
- Early warning of hazards, by supporting early warning systems, for example through the Risk-Informed Early Action Partnership
- In-situ observational platforms to improve forecast initial conditions, and to provide ground truth for forecasts and model projections
- Knowledge on how to integrate technical approaches with broader resilience-building strategies, for example through robust community response plans

### **Information that supports state action on adaptation, particularly at the local level**

- Reinforcing the evidence base on adaptation best practice, for

example through evidence gap mapping or systematic reviews

- Holistic assessment of co-benefits and trade-offs associated with different adaptation measures, including progress towards the Sustainable Development Goals.
- Estimates of the costs of adaptation across scales, and the ability to evaluate the efficacy of alternative adaptation strategies, including through modelling and interdisciplinary approaches.
- Translating climate information at a national level to support understanding and use of data at a local level
- Monitoring and evaluating projects, policies and strategies; reporting and sharing their successes and failures
- Working to improve metrics and frameworks to assess the effectiveness of adaptation action, particularly those parameters that affect success under a changing climate

### **Knowledge to improve the efficacy and flow of adaptation finance**

- Advancing research on effective and efficient use of public funds to leverage private finance investments into adaptation projects; communicating this to policy makers
- Evidence that strengthens the business case for targeting investment in climate-resilient water-resource management and agriculture

- Good practice for adaptation investments, for example the need for bottom-up decision making
- Investigating what is needed to deliver climate adaptation and resilience finance, given a lack of capacity to implement climate finance programmes in many regions
- Providing evidence to better help donors coordinate and collaborate in recipient countries

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*There is a need to present both short or mid-term, and long-term, risks and impacts to enable decision-making. While short and mid-term would aid decisions in natural resource sectors such as agriculture, long-term information will facilitate decision making with respect to infrastructure.*

**DR INDU K MURTHY**

SECTOR HEAD, CLIMATE, ENVIRONMENT & SUSTAINABILITY, CENTER FOR STUDY OF SCIENCE, TECHNOLOGY & POLICY (CSTEP)

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United Nations  
Climate Change



# 4. FINANCE

PANELLISTS AT THE 4TH HIGH LEVEL MINISTERIAL DIALOGUE ON CLIMATE FINANCE AT COP26.

PHOTO BY PHOTOGRAPHER KARWAI TANG/ UK GOVERNMENT / CC BY-NC-ND 2.0

While the cost of action to prevent climate change will be far less than the cost of managing its impacts, still the global shift to net zero and resilient economies will require trillions of dollars of investment. At the same time, we need to urgently invest in adaptation and resilience to help manage the impacts of climate change, especially in more climate vulnerable communities.

## COMMITMENTS

**Meeting the \$100 billion commitment and financing adaptation.** At COP26, 95% of the largest developed country

The UK COP Presidency has prioritised the implementation of the commitment from developed countries to raise \$100 billion every year in climate finance. This finance should be accessible to those who need it, and play a key role in catalysing private finance.

climate finance providers made new, forward-looking commitments. The \$100 billion goal will be reached by 2023 at the latest, and it is now likely that \$500 billion will be mobilised over the period 2021-25. Climate finance providers made specific commitments to increase their support for adaptation (see previous section). The UK, with Fiji, initiated the Taskforce on Access to Climate Finance, which will run trials

with five pioneer countries (Bangladesh, Fiji, Jamaica, Rwanda, and Uganda) to support faster, easier access to climate finance for developing countries.

**Public finance for a net zero future.** Almost all major Multilateral Development Banks now have a 2025 Paris alignment plan, committing to targets of between 30% and 50% of their total investments going to green finance. The ten leading MDBs have collectively announced that they will continue to increase climate finance, including for adaptation. Initiatives by the World Bank Group and Asian Development Bank will share risk with developing countries and raise up to \$8.5 billion to support climate action and sustainable development. 34 countries and 5 public finance institutions committed to ending new direct public support for international fossil fuel extraction and the unabated fossil fuel energy sector by the end of 2022, which will free an estimated \$24 billion a year to flow into clean energy, and will avoid burdening countries with stranded assets. The IMF issued \$650 billion in Special Drawing Rights (SDRs), which helped boost fiscal space for countries. In October, G20 Leaders agreed to channel part of their SDRs to achieve a global ambition of \$100 billion for countries most in need.

**Aligning private finance to net zero.** Over 450 institutions, responsible for over \$130 trillion of private finance assets, are now committed to net zero targets through the Glasgow Financial Alliance for Net Zero (GFANZ). All GFANZ firms also committed to come forward with 2025 or 2030 decarbonisation targets, which is crucial action needed



*Climate Finance aims at promoting investment to reduce GHG emissions, at reducing the impact of climate change and at supporting particularly vulnerable communities to adapt. Local evidence and research are key to determine the best possible opportunities to reduce GHG emissions at a local scale, and also to map the precise impacts of climate change, in order to be able to evaluate the requirements and needs to adapt as locally specific as possible.*

**DR MARÍA TERESA  
RUIZ-TAGLE**

BUSINESS AND ECONOMICS DEPARTMENT  
AT UNIVERSITY OF CHILE



to prove their commitment. To ensure a global approach to disclosing climate risk to financial markets, over 40 countries – representing over 83% of global GDP – will support a new international body, the International Sustainability Standards Board (ISSB) to develop global sustainability disclosure standards.

## EVIDENCE NEEDS AND KNOWLEDGE GAPS

### Evidence on how to mobilise more private finance

- Case studies of private finance flows and their effects on emissions, vulnerability and poverty
- Analysis of institutions and policy to understand how legacy and inertia create barriers to the knowledge exchange between disciplines and sectors required for climate finance
- Knowledge on barriers to private sector investments in mitigation and adaptation in developing countries, particularly for adaptation which currently represents less than 5% of total private climate finance mobilisation
- Baseline estimates for global climate adaptation finance investment flows (public and private) - none currently exist

### Research into improving the quantity and quality of public finance

- Analysis of the quantity and type of finance required to support coal-intensive countries with their transition away from coal, building on the South Africa Just Energy Transition Partnership
- How to spend finance more effectively, to ensure scaled up mitigation and adaptation finance delivers robust impacts and outcomes in line with developing country needs. In particular

understanding high value for money adaptation investments, where impacts are more difficult to calculate, in the poorest and most vulnerable countries

- Tools/approaches for climate finance accounting, and case studies of good practice in accounting and measuring progress
- Barriers to and enablers of coordination and collaboration between donors
- Novel finance instruments (such as equity and guarantees), including how to structure them and lessons from existing instruments
- Opportunities for regulatory alignment to enable capital investment into net zero; examining barriers to that investment, for example in fiduciary duty and solvency regulations
- Data, analytics, and strategies to help public financial institutions avoid stranded assets and carbon lock-in

### Research to help finance institutions ensure that every financial decision takes climate change and nature into account

- Improved micro-level analysis of how companies incorporate climate risk management and the costs of inaction. This includes adapting theoretical instruments to micro-level financial analysis
- Finance stress tests and

scenarios for financial markets to use when evaluating risk, linking climate and nature science models into real-world finance scenarios

- Key performance indicators, risk indicators and common standards to provide improved structure to policies in the financial sector, particularly with regard to emerging global principles for firm-level transition plans
- Open and global climate-related physical risk indices to help the management of physical risk, especially in developing countries and areas currently underserved by commercial risk and catastrophe modelling



# 5. COLLABORATING FOR ACTION

CHILDREN LEARNING ABOUT SOLAR PANELS, RENO, NEVADA.

PHOTO BY PHOTOGRAPHER JESSICA REEDER / BLACKROCKSOLAR / CREATIVE COMMONS

## SHARE KNOWLEDGE

Researchers, innovators and engineers can help inform understanding of climate change, as trusted independent actors. As well as informing decision makers directly, knowledge holders can reach out to the wider public, debunking misinformation, and holding policymakers to account.

In the preceding three sections we have laid out some of the areas where knowledge and evidence can support the implementation of commitments made at Glasgow. The best knowledge and advice should be available to policy makers, recognising that other factors also influence policy decisions. This section highlights some of the ways in which researchers, innovators and engineers and their institutions can channel their expertise to those who need it, including policymakers, institutions, companies and the public. Many of these involve collaboration.

Knowledge holders can share their expertise directly, of course, by writing blogs and other opinion pieces online, in newspapers, popular science magazines and on social media. Platforms such as [Transform21](#) allow the research community to share global climate-relevant initiatives and materials.

Alternatively, knowledge can be transmitted effectively by working with others. For example by:

- Conducting training programmes for journalists on the science of climate change
- Working with non-governmental organisations and think tanks, which can facilitate coordination between local knowledge holders, business and government decision makers
- Participating in government open consultation calls
- Offering local expertise for urban initiatives with dedicated climate offices, for example through [C40](#), or local networks such as the [Placed-based Climate Action Network](#).
- Building collaborations with industry to support capacity building and technology development and transfer

## **BUILD RELATIONSHIPS**

Helping to build relationships between economic sectors and different groups in society can ensure information reaches those who need it, in a form that they can use – sharing best practice and lessons learned between knowledge holders and practitioners.

For example, the research community can support community-based and indigenous knowledge holders in disseminating their adaptation knowledge at national and international levels, and documenting practical solutions to reduce climate risks and vulnerabilities. Collaboration between knowledge holders and non-state actors can build interdisciplinary and solutions-focused approaches. In the transition from coal, solutions co-produced with civil society and the private sector can accelerate just transitions in coal-dependent communities.

Research that builds and strengthens partnerships between development and private finance communities can help to mobilise private finance, using research methods that enable dialogue, knowledge exchange, and translating technical information for lay audiences. This may be done for example through the Institutional Investors Group on Climate Change and the United Nations Environment Programme Finance Initiative.

## **STUDY, ADVISE AND JOIN INTERNATIONAL INITIATIVES**

The COP26 Presidency has bolstered or initiated a range of climate initiatives focused on particular sectors. Researchers, innovators and engineers can study these initiatives to identify best practice and barriers to progress, provide technical assistance to the members in meeting their commitments, or join to ensure decisions are made on the best available science. For example, individuals or institutions can:

- Contribute to the [Powering Past Coal Alliance](#) and the newly-

established [Energy Transition Council](#), working with members to assist them in their transition away from coal

- Join the [Coalition for Disaster Resilient Infrastructure](#), sharing knowledge on infrastructure risk management, standards, financing, and recovery mechanisms
- Join the [Adaptation Research Alliance](#) to support solutions-focused adaptation research. Contribute to the [Policy Action Agenda for Transition to Sustainable Food and Agriculture](#) by providing recommendations on how countries can achieve a just rural transition
- Ally with [Climate Shot](#) to transform and accelerate innovation in agriculture

## DEVELOP GLOBAL POLICY-ORIENTED SCIENTIFIC NETWORKS

Researchers, innovators and engineers are well placed to develop and grow international collaborations and alliances on research and innovation, to accelerate the discovery of new knowledge and develop low-carbon and adaptation solutions.

Science-to-policy platforms, networks, and consortia can underpin action on ambitious targets and goals, and promote innovation of technology, tools, applications, and models (e.g. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and Intergovernmental Panel on Climate Change).

Networks and professional associations, including science academies, draw on members' expertise to address policy challenges, and to synthesise technical information into accessible formats for policymakers, NGOs and the wider public.

The [International Science Council \(ISC\)](#), the [InterAcademy Partnership \(IAP\)](#), and [Global Young Academy \(GYA\)](#) lead these collaborative efforts. Open and inclusive groups of practitioners, such as the [International Network of Government Science Advice \(INGSA\)](#) provide extensive resources for science policy practitioners. International and national research institutes and networks are also working to raise the profile of climate science. For example, the [International Institute for Applied Systems Analysis](#) and [Leading Integrated Research for Agenda 2030, Future Earth](#), the [Earth Commission](#), [Integrated Research on Disaster Risk](#), the [Institute for Global Environmental Strategies](#), [Risk Knowledge Action Network](#), the [United Nations Office for Disaster Risk Reduction Arise network](#) and [Science Based Targets](#), among many others.

## ADVISORY BOARDS, CONSULTATIONS AND ROUNDTABLES

Policy makers can access the most recent research through advisory boards, collaborative roundtable discussions, climate-related policy initiatives' open consultations, and calls for scientific input and experts. Examples include providing evidence for international consultations, such as those relevant to the United Nations

Framework Convention on Climate Change ([UNFCCC](#)), Intergovernmental Panel on Climate Change ([IPCC](#)), Sustainable Development Goals ([SDGs](#)) and [Sendai Framework](#). The [ISC](#) coordinates many of these consultations in its capacity as organiser of the [Science and Technology Community Major Group](#) (in partnership with the World Federation Of Engineering Organisations, in the case of the SDGs).

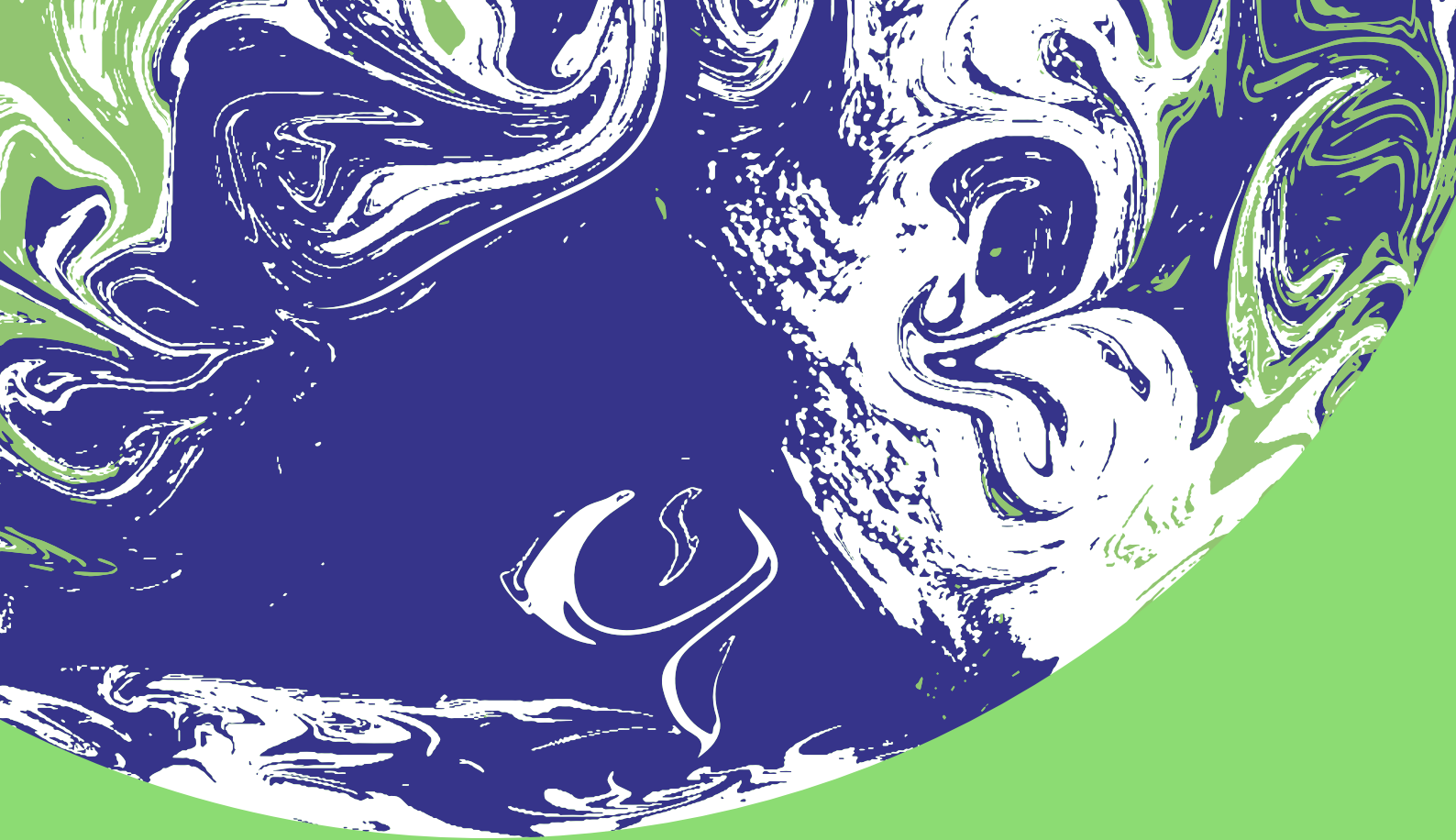
## CAPACITY BUILDING

Universities and research institutions play a critical role in building capacity to understand and, respond to, climate change. The COP26 Catalyst for Climate Action is a UK Presidency convened framework that brings together key stakeholders to discuss challenges and catalyse action on capacity building. It recommends how to target capacity building in areas related to adaptation, finance, carbon markets and reporting, for example through wider consultation at three UN Regional Climate Weeks. Its four Action Groups have developed four sets of [recommendations](#) and a [Call to Action](#) drawing together the key thematic links of capacity building challenges. Universities and research institutions could play a role in further promoting and embedding these recommendations, including through engaging with the [Paris Committee on Capacity Building \(PCCB\) Network](#).

## EDUCATION AND SKILLS

The research, innovation and engineering community plays a crucial role in providing the education, training and technical assistance that underpin all of the COP26 goals. In energy,

transport and land use, for instance, a sustainable and just transition to net zero will rely on universities and colleges around the world teaching, training and supporting their existing workforces, as well as new entrants. Signing up to the [SDG Accord](#) and the [Race to Zero for Universities and Colleges](#) can support institutions on these objectives. For goals on adaptation and finance, formal education and training has a central role in enhancing capacity for action in local contexts and based on the best available evidence. The global reach and partnerships of researchers, innovators, engineers and their institutions provide an unrivalled platform for knowledge exchange, and the development of improved climate resilience and finance. Universities can collaborate by joining the Environmental Association for Universities and Colleges' (EAUC) [Global Alliance](#).



# 6. CONCLUSION

This document aims to show how research, innovation and engineering knowledge can support the achievement of the Glasgow commitments.

The Presidency put science and innovation at the heart of COP26, recognising and building on the continuous efforts of the research community to acquire and apply new knowledge to reduce carbon emissions and adapt to warming, and to work together with the policy community to provide knowledge and evidence based advice.

We now have the opportunity to work together across sectors, disciplines and borders, to accelerate the transition to low-carbon and climate resilient economies that are thriving and just.



**COP26  
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DELIVERING THE  
GLASGOW CLIMATE PACT

## ANNEX A: PROCESS

The document was drafted by the COP26 Presidency and reflects the knowledge gaps and evidence needs that act as barriers to countries signing up to, and acting on, more ambitious mitigation, adaptation and finance commitments. To ensure these areas of knowledge reflected a global picture, the COP26 Presidency worked with the UK's global [Science and Innovation Network](#) to convene 135 academics and experts from the science-policy interface across 100 institutions through thematic virtual workshops in ten countries. The countries, topics and participants for each workshop are listed in Annex B below.

The participants were given a draft of the document to review before the workshops, and discussions focused on three questions:

1. What knowledge/expertise exists that academics can mobilise to support the campaigns and motivate action in this area?
2. Where are the key mechanisms for academics to influence decision making or ensure that research and knowledge reaches those who need it, in your country/region?
3. What are the existing scientific gaps that can be filled by new research or collaborations?

Workshop discussions were recorded, and relevant areas of research and pathways to policy were incorporated into the document as appropriate.

The COP26 Presidency would like to thank members of the International Science Council, the UK's COP26 Universities Network and UK's Royal Society, Royal Academy of Engineering and British Academy) for their comments and suggestions on earlier versions of this document.

# ANNEX B: CONTRIBUTORS

The COP26 Presidency would like to thank all those who contributed to the development of this document, in particular by attending our international academic workshops. All workshop participants are listed below.

Please note that these contributors and institutions are not responsible for the final content in the report.

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