

## Science, Climate Policy and COP27

Date and Location: 26th October 2022 at The Royal Society

Chair: The Rt Hon. the Lord Willetts FRS  
Chair, The Foundation for Science and Technology

Speakers: Sir Patrick Vallance KCB FRS FMedSci FRCP  
Chief Scientific Adviser to HM Government  
Professor Mahmoud Sakr  
President, The Academy of Scientific Research and Technology (ASRT),  
Egypt  
Emma Howard Boyd  
Breakthroughs Agenda High-Level Champion, COP 26  
Professor Jim Skea CBE  
Chair in Sustainable Energy and Co-chair of Working Group III of the IPCC.

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Audio/Video Files: [www.foundation.org.uk](http://www.foundation.org.uk)

Hash tag: #fstCOP27. Twitter Handle: @FoundSciTech .

SIR PATRICK VALLANCE noted that the thing which will occupy Governments for the next 20 to 50 years will be the climate, and our science and evidence base will be crucial, both for tracking where we are, and identifying solutions. COP26 was the first COP with a dedicated science day, and the first with a dedicated Chief Scientific Adviser.

COP26 agreed a text to phase out fossil fuels, and support for innovation in green technologies to help solve the problems we are facing. 130 countries agreed to halt and reverse forest loss and land degradation by 2030. On adaptation, a research alliance was launched, which agreed a letter to world leaders on the key issues that needed their attention.

Whilst progress in COP26 was positive, the scale of the challenge is extraordinary, and external factors such as the war in Ukraine make it harder.

There are three areas we can prioritize. Firstly, more research is needed. For example, a recent paper in Nature showed potential tipping points – and better resolution modelling at finer granularity would help.

Secondly, scaling up existing innovation to a national level is needed, and this is a massive technical and operational challenge. New innovation is also needed, for example in energy storage.

Thirdly, understanding human behaviour, how we choose to adopt things (and whether we can afford them) is key.

We now need to move from aspiration to delivery plans. This will be difficult, both practically and politically. For innovation at scale by 2050, we need innovation implementation in the next five years. Those detailed plans, and the mechanisms to deliver them, are needed quickly, as is the ability to monitor progress. This is a systems problem – we can't just pick off individual elements, and if the system is not well understood, there could be unintended consequences from our decisions.

PROFESSOR MAHMOUD SAKR noted the benefits of science being integrated into COP26 and thanked the UK for driving this. Time for Egypt to prepare for COP27 had been limited, but they have received support from the science community in the UK and elsewhere.

COP27 was an African COP, and Africa wants to see implementation, both in mitigation and in adaptation. So what is the role of science in overcoming the barriers to implementation? In some sectors, such as agriculture, it is easy to use technology to reduce CO2 emissions. The problem is scale

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up and mass application of technology, which requires both significant funding and a change in mindset in some traditional farming communities. This is a challenge.

Egypt is integrating climate research and the sustainable development goals into its National Development Plan. A specific goal is to enhance scientific research, knowledge transfer and public awareness. The Egyptian President is committed to climate change actions, and the government is implementing a number of mega projects. For example, the Benban Solar Park, producing up to 1700MW, the transformation of the Egyptian transportation system from fossil fuel to electric, efficient use of water, and building new, resilient smart cities.

Egypt is strong in climate change research, meaning local and regional scientific communities are well aware of the problems. There has been good collaboration with the UK universities network on developing policy papers (e.g. on the implications of climate change on health and food security). Egypt's Green Fund will create an enabling environment for green technologies, and help with awareness raising and changing mindsets. For example, Egyptian scientists have shown the government that it is important to invest in a national breeding program to develop crop variety more tolerant to adverse environmental conditions, and we have a collaboration with the International Rice Research Institute to develop rice with low water demand.

In renewable energy, work started in 2015, and with a grant from the EU, they have established a major R&D facility in renewable energy, serving not only Egypt but also Africa and the Middle East. Research is needed in different geographical zones (for example high temperature deserts). When it comes to dealing with climate change, one size does not fit all. There are differences not only in geographical zones, but also in technology readiness, finance, culture and religion. We need to demonstrate that investment in actions such as biodiversity can also generate revenue.

Egypt plans three big events in the Blue Zone in COP27. One is REDIRECT, a project looking to support the effort in vulnerable countries to support climate change confrontation. The second is related to the WIPO Green Technology report, and how green innovation can help countries' efforts in confronting climate change. The third is a window for international science to help the redesign of strategy in a changing world.

EMMA HOWAD BOYD noted that as well as racing to Net Zero, we need to become more resilient and learn to adapt to the future environment. The UK saw a temperature of 40 degrees for the first time in 2022, the heatwave leading to 2800 excess deaths. And in recent months we have seen floods in Pakistan, heatwaves in California, wildfires in Europe and typhoons and tornadoes causing mass damage and loss of life.

Studies suggest African nations are losing 5-15% of GDP annually due to climate impacts, and global losses in 2022 from natural disasters already total \$227 billion dollars. 40% of the world's population is highly vulnerable to climate change, and it's not in the future, it's now. We need cheaper, more accessible, more secure Zero Carbon Energy, and tackle current surging food prices.

There are areas for optimism as we head towards COP27. Firstly, the Breakthrough Agenda saw 44 countries plus the European Union, representing over 70% of global GDP, commit to making clean technologies to most affordable and attractive option in high emitting sectors before the end of this decade. Progress is being made in investment and solutions but is not fast enough to meet the goals set.

An expert group will report during COP27 on how to tackle poor corporate commitments. Alongside corporate commitments are massive green finance opportunities – which can be seen as direct application of science to financial decision making. As inflation, interest rates and tax rates are increasing, some in the financial sector are advocating a return to delivering high risk adjusted returns, instead of focusing on environmental, social and governance matters. There is a lot of money to be made from new fossil fuel projects, for example. To counter this, we need work on deploying bank lending bond issuance, initial public equity offerings, private equity, venture capital, real asset investments towards real economy, direct investment. That means collaboration between all aspects of the financial ecosystem, more emphasis on public capital, and philanthropic capital being used to lower the risk for commercial mainstream capital, to redeploy its money towards sustainable opportunities.

Investing in adaptation and resilience works – for example the UK Environment Agency's investment in flood defences. Infrastructure needs to be built ready for the climate events that we know are locked in – adaptation standards are needed. Governments should commission reviews on the economics of resilience. The Coalition for Climate Resilient Investment are doing much early work in this space, and the PCRAM

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methodology provides practical tools to assess the resilience of infrastructure assets.

If we can align this work, we can unlock a just resilient and sustainable path to prosperity for billions of people around the world.

PROFESSOR JIM SKEA noted the importance of the science day in COP27, and that the IPCC will be interfacing with the negotiations -through both science push and policy pull. The main route for science push will be an IPCC shared pavilion, which is branded science for climate action. On the policy pull side, policy makers will be asking for scientific input to help with the negotiations. An element of that will be the contribution to the first global stocktake and the technical dialogue

The IPCC has 20 slots in the shared pavilion, eight focused on inputs (Working Group 2), eight focused on mitigation (Working Group 3), then two each on science and on inventories (Working Group 1). For mitigation, there will be two sessions on scenarios, one on what has been done so far, and the second on how to construct scenarios that are more meaningful to policymakers. There will be a session on reconciling greenhouse gas emissions, to explain why there is a 5Gt difference between the emission estimates submitted by countries under the Framework Convention and the emission estimates used in global models. That's 10% of global emissions, and the information is difficult to communicate but has a real significance in Net Zero targets. Another mitigation session will be on mitigation through demand sides responses. This can be controversial to policymakers but the IPCC has reported on behavioural issues for the first time. There will also be a session on Just Transitions.

IPPC Working Group 2 will have a number of events on impacts, adaptation and vulnerability. These are still in development but there are likely, for example, to be a sessions on nature-based solutions, and another focusing on the specific issues of small islands.

There will also be cross-Working Group sessions, including one on overshoot (what will it mean to exceed 1.5 degrees warming?), another focused on urban policymakers and a third on near-term preparedness and risk management.

There will be a separate Earth information day at COP27, with sessions on observations for adaptation and early warning systems, and also Earth observations for mitigation. There will be a session on assessing adaptation needs, and one on the way that gender balance could be improved within the negotiation on the scientific processes. There will also be a high level

ministerial roundtable on pre 2030 Ambition.

There is an emissions gap (current pledges will not get deliver 1.5 degrees) and an implementation gap (current policies are not delivering on pledges). The next global stocktake will be in 2023, and this year there is a technical phase providing evidence for that stocktake.

In conclusion, the negotiations are hungry for science advice, and we have to keep the science alive.

IN THE DISCUSSION PERIOD, the first round of questions focused on loss and damage, on climate finance, on the need for international institutes and on health impacts of climate.

In response, the panel noted that Africa needed not just finance but also access to data and information, and capacity building in terms of both individuals and institutions. African countries need to align themselves to global efforts – they are focused on adaptation and resilience, but should also focus on mitigation and lowering CO2 emissions. In terms of health, Africa suffers a lot from emerging diseases and from a fragmented health system.

On the question of an institutional gap, the panel noted that there was an oligopoly of about five or six major groups that participate in the climate and integrated assessment modeling process. That works well, but participants are from a relatively small number of countries – and the questions being asked by the models may reflect a global North perspective. The panel also wondered what an institution could achieve that can't be done in a distributed model – though a global institution may have a role to address a few very specific things where you need a significant infrastructure in order to do the work.

On finance, the panel noted that the global community has not agreed the \$100B package to support developing countries that was initially propose, and there are discussions on reforming global financial systems (not just at COP). Science can help in the loss and damage / attribution debate

The second round of questions focused on whether the institutional arrangements for the delivery of net zero in the UK were sufficient, what the new UK Government's plans are for energy, and whether there sustainability and climate change should be taught in all schools globally. There was a question about how to identify the sweet spot where taking climate action makes money. And there was a contribution testing four assumptions that were being made – firstly that mitigation was possible, secondly that private capital was going to get the job done, thirdly that it is primarily

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and engineering problem, and lastly that without a just transition, the politics are impossible.

In response to the question on UK arrangements, the panel noted that 3 years ago, the Council for Science and Technology wrote to the Prime Minister saying that there needs to be an integrated systems approach, and therefore government needs a systems map at the centre, measuring and monitoring and influencing competing actions. We are not there yet.

For the question on what the new Government is going to do, the panel noted the upcoming review by Chris Skidmore asking what would it take to implement Net Zero. Delivering the recommendations from this review will require a delivery mechanism inside government. A review of the science needed has already been completed.

On the role of private capital, the panel agreed that the market would not solve this alone, hence the need for government action. Some things need major infrastructure investment, and to get there, a big, clear government decision (for example, a move to a hydrogen economy needs large investments in the right infrastructure). The panel also noted that you need climate change regulators, economic regulators and financial regulators working in lockstep. There are good examples of how to make money from green initiatives, and work is needed to get this information into the public domain, and for countries to learn from each other.

The panel noted that incremental change would not deliver net zero, and also expressed concern that some activities were locking in carbon for the future. On just transition, the panel agreed that we can not tackle climate change unless it is seen to be done fairly.

The panel also noted the importance of education, and the need to incentivise local communities, so we have public engagement and acceptance.

Gavin Costigan