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IOP Institute of Physics

IOP Climate Change Position Statement

Ahead of the UN Global Climate Change Conference (COP26) taking place in Glasgow in November 2021, the Institute of Physics (IOP) reaffirms its support for the scientific case for climate change caused by human activity and the role of physics in identifying the challenges and providing the solutions.

For many decades, changes to the climate have been observed around the world. A strong scientific consensus has emerged around the causes, with the evidence now very strongly indicating that climate change has been driven primarily by humans through the emission of greenhouse gases. The most recent synthesis of scientific research from the Intergovernmental Panel on Climate Change, published in August 2021,[1] is robust and compelling. It finds that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred and that it is 'unequivocal' that human influence has warmed the atmosphere, ocean and land.

The scientific evidence is now overwhelming that globally the climate is warming and that human activity is largely responsible for this change through emissions of greenhouse gases. Climate change poses substantial risk to human life, societies and economies, and to ecosystems that sustain the natural world. Limiting global warming to 1.5°C above pre-industrial levels is the minimum essential for preventing the increased likelihood of food insecurity, widespread species extinction and dramatic changes to human activity.[2] Damage to habitats is already widespread and changes to weather patterns, with more regular extreme weather episodes, are predicted to accelerate well into the future, even if current climate targets are met. As the institution representing the physics community, the IOP agrees that the scientific case for anthropogenic climate change is consistent and persuasive.

To avoid the worst-case scenarios, a move to net zero carbon emissions is essential, along with adaptation to live with the impacts caused by global warming. The UK has committed to reduce its net emissions of greenhouse gases by 100% relative to 1990 levels by 2050, making it a 'net zero' emitter. The necessary transition to a zero-carbon economy presents huge societal

[1] IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

[2] IPCC, 2018: Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)].

challenges, including significant economic change and impacts on human behaviour.[3] These need to happen as a matter of urgency and must be led by government at all levels, but others also have a role to play, including individuals, businesses, local communities, public institutions, and wider civil society. With these changes also comes a significant opportunity for innovation and technology to enable movement away from a carbon economy and to mitigate the impacts of climate change. This can be a driver of economic development, but needs to be supported with sustained investment in research and development, entrepreneurship, education, public engagement, training and skills. At the forefront of these efforts will be the continued engagement of the physics community if we are to both mitigate the impact of, and adapt in response to, climate change.

The IOP has been active, often in partnership with other UK learned societies, in supporting activities to study climate change. The IOP is now calling on government to prioritise the transition to a resilient, Net Zero economy and will set out its own plans on how we will play our part in reducing emissions with our own pathway to net-zero carbon. This transition must also be used as an opportunity to create a fair economy, in which the benefits are shared equally across all parts of society.

Physics has, and will continue to have, a crucial role to play in investigating anthropogenic impacts and predicting environmental outcomes, as well as considering responses and solutions. To date, research has ranged from data collection, analysis, computer modelling and interpretation, to creating practical alternatives to fossil fuel usage, developing innovative technologies to mitigate against further changes, and designing and implementing novel environmental solutions.

Physicists and the wider physics community have already contributed to determining our climate change responsibilities and, together with the IOP, will continue to help in every way conceivable to achieve both a better understanding of the challenges we all face, and the pioneering solutions required to address them.

Additional information

For further information about the IOP's policy work, please email policy@iop.org.
All the IOP's policy positions can be found at https://www.iop.org/policy.

[3] IPCC, 2019: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]; IPCC, 2019: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)].