The IChemE Energy Centre Climate Communiqué

We know that climate change is real. Chemical engineers have the tools to mitigate it and are already helping to reduce our reliance on fossil fuels.

human activity and climate change

The scientific case around the causes of climate change is settled. John Tyndall determined that CO_2 was a greenhouse gas in 1859. Since that time, CO_2 concentrations have risen from approximately 280 parts per million (ppm) to over 400 ppm. It has been demonstrated that our climate is warming and that human activity (through emissions of CO_2 and other greenhouse gases) is the main cause. In 2014, the Intergovernmental Panel on Climate Change (IPCC) stated that the evidence of anthropogenic emissions of CO_2 and other greenhouse gases causing climate change was unequivocal[1].

risks of inaction

The risks posed by climate change, though complex, are sufficiently well understood to justify action. To date, however, we have not responded appropriately to the gravity of the threat. Indeed, since the IPCC's formation in 1988, numerous conferences and summits have been held on this issue but little has been achieved. In the same period, atmospheric CO_2 concentrations rose from 350 ppm to over 400 ppm.

The lack of action at previous conferences and summits means that, at the climate talks in Paris later this year, governments need to reach an effective, global agreement. Any failure to do so could have serious adverse effects on human wellbeing and the natural world.

responding with what we have to hand

Responding to the climate challenge is actually very simple. Globally, we derive more than 80% of our energy from fossil fuels, which currently results in vast amounts of CO_2 being emitted into the atmosphere. We need to stop doing this.

In fact, we already have the technologies needed to achieve the target of limiting atmospheric CO_2 concentrations to 450 ppm. Referring to Pacala and Socolow's concept of "stabilisation wedges"[2], adopting existing approaches to energy efficiency and conservation, fuel switching, renewable energy and energy storage, on a widespread basis across all sectors (including transport and the built environment), when combined with carbon capture and storage (CCS) and nuclear power and improved land management and afforestation, will decrease, and then remove, our reliance on fossil fuels.

While fundamental research continues to be important, it is vital that we rapidly scale up the use of existing technologies. All technologies – from renewables to CCS and nuclear – will need to play a part in decarbonising the global economy. The choices to be made in deciding between them are complex; in making these decisions, system-scale costs and interactions have to be fully considered and properly accounted for.

meaningful action

For these technologies to be adopted on a widespread basis, governments need to reach an agreement at COP21 that provides the clarity, certainty and incentives to allow businesses, communities and individuals to act.

Governments, in any agreement, have to commit to a long-term carbon target – the UK is alone in the world in having a 2050 goal, whereas other countries look out in intervals of four or five years. Governments need to provide confidence in the long-term reliability of these targets – changing course every four or five years is profoundly unhelpful. Any agreement should also specify mechanisms for achieving these agreed targets, including a global carbon pricing system, offset agreements between governments and provisions enabling technology transfer.

If such an agreement can be reached in Paris, then the mitigation of climate change is a realistic goal.

Our message is simple: *we must mitigate climate change and chemical engineering is part of the solution, but we must act now.*

further reading

1. *Climate Change 2014: Synthesis Report.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, IPCC, 2014.

2. Pacala and Socolow, *Science*, vol 305, 5686, 968–972, 2004.