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A clear direction

The process established by the Intergovernmental Panel on Climate Change has generated a sound foundation of knowledge on which policy-makers must now build.

And so, for another six years at least, it is over. Thousands of authors referring to vast numbers of papers have, in sometimes-contested consultation with the governments that lend their name to the process, provided the world with their best assessment to date of humanity's prospects and options in the matter of climate change.

The Intergovernmental Panel on Climate Change (IPCC) is far from a perfect institution, but it is a necessary and a heartening one. To see the governments of the world almost unanimously acknowledge that they share a problem, and set up a process for identifying its scope that is rooted in the impartial norms of science, is in itself a reason for hope about the century ahead.

The final contribution to the IPCC's fourth assessment report is, as we report on page 120, a rather upbeat one. Shifts in the way the world generates and uses energy can, the panel says, reduce the risks of climate change in exchange for only a fairly small slowing in the rate of growth of GDP. Various ways of bringing about such shifts are discussed. But perhaps because the IPCC is devoted to consensus, the relative merits of those schemes are not explored.

This is because two economists, or for that matter two nations, can agree on their analysis of the subject but still differ on what needs to be done. That decision rests in the political sphere.

The G8 summit in Heiligendamm, Germany, next month will offer powerful nations the chance to discuss the merits of opting *en masse* for the European Union's policy of halving carbon dioxide emissions by 2050. Six months later, in Bali, Indonesia, the countries that have signed up to the United Nations Framework Convention on Climate Change and the Kyoto Protocol will be able to begin the process of thrashing out what to do next — specifically, whether to extend and expand the Kyoto Protocol when its first commitment period comes to an end in 2012, or replace it with something else. However it develops, this stage must reaffirm the Kyoto goal of broad and coordinated reductions but must apply it more widely than the current protocol. Just as Kyoto was deeply flawed by the decision of the world's largest emitter of carbon dioxide to remain outside it, so the next agreement will be flawed if the same is true after 2012 — even though, by then, the potential holdout would be by China, not the United States.

There are no concrete plans for a fifth IPCC assessment before 2012. But some sort of continuity in the assessment of where the science of climate change is headed, its foreseeable impacts and the tools at policy-makers' disposal is a high priority.

It is unavoidable that many climate scientists care deeply about their work's implications, and quite proper, as this process unfolds, that they should make their concerns heard. But scientists and their managers also have a duty to explore all the options — and to put aside their personal preferences in offering advice to governments. In this, the community has not always been beyond reproach.

One research area that has been ignored, in part because of prior ideological commitments, is geoengineering, which explores in what circumstances aspects of the climate system might be deliberately modified to limit the worst eventualities of climate change (see page 132). It is true that some bizarre projects fall under that name — notably, various ill-conceived schemes for fertilizing the oceans. But the idea that more active management of soil carbon could offset future emissions is sound (see page 143).

It would be far better for such ideas to be examined scientifically — and their failings thus held up to scrutiny — than not. Those scientists who have started to raise this debate deserve thanks, support and, of course, rigorous criticism from their colleagues. In climate research and beyond, it is important to remember that the value of scientists' work comes not just from the research and expertise that allows them to inform debates, but also from the object lesson they provide in the ways in which a community rich in specialities and diverse interests can come to a comprehensive and objective overview. ■

Starting at the top

Scientific élites retain a severe gender imbalance.

Seventy-two names are on the list of new members of the US National Academy of Sciences, elected on 1 May. Nine stand out: Tania Baker, Ursula Bellugi, Karen Cook, Mary Estes, Pamela Fraker, Angela Gronenborn, Helen Hobbs, Laura Kiessling and Eve Marder.

Two years ago, the academy elected 19 women to its ranks; this year, the number is less than half of that. Over the years there have been a plethora of programmes designed to introduce women into science, and more sporadic efforts to keep them in the career pipeline while they bear and raise children. Yet women have still not come remotely close to closing the gender gap at the senior level.

Of course, some women do reach the scientific élite: at its meeting last week, the academy awarded its highest honour, the Public Welfare Medal, to biologist Maxine Singer. But Singer has little female company at the top of the scientific hierarchy.

Roughly 10% of members of the science academy are women. This is up from just 6% in 2000, but is still a disappointing number. Even as the percentage of women rises in many research fields, women still find it harder to join the scientific élite — even in the United States, where they have had a firmer foothold for longer than elsewhere.

As US science's most exclusive club, the academy is fully aware that its membership is dominated by white males of a certain age, and has made attempts to address the fact. New members are nominated and