

The beyond-two-degree inferno

In the history of humankind, there is a dearth of examples of global threats so far-reaching in their impact, so dire in their consequences, and considered so likely to occur that they have engaged all nations in risk mitigation. But now with climate change, we face a slowly escalating but long-enduring global threat to food supplies, health, ecosystem services, and the general viability of the planet to support a population of more than 7 billion people. The projected costs of addressing the problem grow with every year that we delay confronting it. In recognition of the shared risks we face and the collective action that will be necessary, an international meeting of stakeholders will convene in Paris next week (www.commonfuture-paris2015.org), ahead of the United Nations Climate Change Conference (COP21) in December, to discuss solutions for both climate mitigation and adaptation.

The time for debate has ended. Action is urgently needed. The Paris-based International Energy Agency recently announced that current commitments to cut CO₂ emissions [known as Intended Nationally Determined Contributions (INDCs)] from the world's nations are insufficient to avoid warming the entire planet by an average of more than 2°C above the preindustrial level. This is a target viewed as the boundary between climate warming to which we can perhaps adapt and more extreme warming that will be very disruptive to society and the ecosystems on which we depend (see Gattuso *et al.* on p. 45). To set more aggressive targets, developed nations need to reduce their per-capita fossil fuel emissions even further, and by doing so, create roadmaps for developing nations to leapfrog technologies by installing low-CO₂-emitting energy infrastructure rather than coal-fired power plants as they expand their energy capacity.

The European Union (EU) is leading the way with the most aggressive INDC target for reduction: a cut of 40% below 1990 levels of CO₂ emissions by 2030. The United

States has pledged reductions of 26 to 28% below 2005 levels by 2025, with California independently choosing to match the EU's more ambitious goal. All eyes are on China and India, two of the largest total emitters of CO₂, both of which have yet to submit their proposed INDCs in advance of COP21. Unfortunately, Piyush Goyal, India's Minister of State for Power, Coal, and New and Renewable Energy, intends to double his nation's coal production by the year 2019 to meet domestic energy requirements. China appears to be taking the opposite track, recognizing its vulnerability to climate change and investing heavily in renewable energy.* Like California, China is betting that good environmental policy will make for good fiscal policy by being in the vanguard of the clean energy economy.

I applaud the forthright climate statement of Pope Francis, currently our most visible champion for mitigating climate change, and lament the vacuum in political leadership in the United States. This is not the time to wait for political champions to emerge. Just as California has decided to go it alone, every sector (transportation, manufacturing, agriculture, construction, etc.) and every

person need to do whatever is possible to reduce carbon pollution by conserving energy, adopting alternative energy technologies, investing in research, and capturing CO₂ at the source.

In Dante's *Inferno*, he describes the nine circles of Hell, each dedicated to different sorts of sinners, with the outermost being occupied by those who didn't know any better, and the innermost reserved for the most treacherous offenders. I wonder where in the nine circles Dante would place all of us who are borrowing against this Earth in the name of economic growth, accumulating an environmental debt by burning fossil fuels, the consequences of which will be left for our children and grandchildren to bear? Let's act now, to save the next generations from the consequences of the beyond-two-degree inferno.

– Marcia McNutt



Marcia McNutt
Editor-in-Chief
Science Journals



“where [would]...Dante...place all of us who are borrowing against this Earth...?”

*www.bbc.com/news/science-environment-33040965.