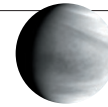


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A seismic shift

After 25 years of divisive debate, the governments of the world unite in Paris to fight global warming. But the hard work must start now.

On 12 December, French foreign minister Laurent Fabius passed into existence a landmark agreement on global warming, and without a single word of discussion. The small green gavel produced only a soft crack at the United Nations climate summit in Paris, a sound quickly overwhelmed by a standing ovation. But that sound should echo. It ushered in a seismic shift in international environmental and economic policy. If everything goes according to plan, the reverberations will be felt around the world for decades — and perhaps centuries — to come.

The Paris agreement strengthens the previous goal of limiting warming to 2 °C above pre-industrial levels, ultimately suggesting that governments should “pursue efforts to limit the temperature increase to 1.5 °C”. Pushed by a coalition of island nations and some of the most vulnerable countries on Earth, this change offers a nod to scientific research, which suggests that even the 1 °C of warming experienced thus far is already having effects. Current commitments to reduce emissions might put the world on a path to keep the rise in temperature below 3 °C, and even that assumes substantial action in the decades to come. But all countries must revisit — and hopefully strengthen — their pledges every five years, beginning in 2020.

Despite the contradiction between commitments and goals, the Paris accord is a vast improvement over the last binding agreement to curb emissions. The 1997 Kyoto Protocol explicitly divided the world into two factions, rich and poor, and it required only rich nations to reduce their emissions. In so doing, it tried to address legitimate questions about equity and fairness. Poor nations argued — justifiably — that wealthy countries have profited immensely from fossil fuels, and that they were responsible for the bulk of historical greenhouse-gas emissions. They asserted their right to focus on lifting people out of poverty, while wealthy countries concentrated on bringing emissions down and developing technologies to enable everybody else to follow. It was a reasonable proposition — but it was destined to fail.

Emissions have continued to rise. Although most of the past emissions have come from wealthy nations, the bulk of those in the future will come from developing countries. Scientists have made it abundantly clear that every country must do everything that it can, and as fast as it can, if the world is to prevent the worst consequences of global warming.

The Paris agreement seeks to bridge the divide with carrots rather than sticks. Although countries agreed to engage in this new process, any action that they take to reduce emissions is on a purely voluntary basis. Indeed, the final change to the agreement in Paris, which took place quietly just minutes before the text was adopted, was to replace a ‘shall’ with a ‘should’ in a line stating how developed countries will commit to reducing emissions. This shift towards a voluntary framework based on national commitments was a necessary first step to bring everybody on board — and it worked.

Things may yet unravel. When negotiations pick up next year, the

first task will be to spell out exactly what information countries need to submit regarding their emissions and commitments, and how the review process will work. Given that there are no penalties for failing to achieve a commitment, the foundation of this agreement is transparency.

Governments, scientists and advocacy groups need solid information to verify that everybody is living up to their commitments and to transfer knowledge about what works and what doesn’t. The last — and often overlooked — piece of this puzzle is that developing countries will need help to establish the academic and technical expertise needed to meet these new international standards.

“The Paris agreement represents a bet on technological innovation and human ingenuity.”

The Paris agreement represents a bet on technological innovation and human ingenuity. If governments follow through, companies and investors will shift resources towards clean energy to secure a place in an economy that will look very different several decades on.

In many ways, the debate about the long-term temperature-rise goal is symbolic. In the end, as noted in the agreement itself, the world needs to reduce net greenhouse-gas emissions to zero — and to do that, all countries must seek to halt the rise and bring down their emissions as soon as possible. Everybody has a role in making that happen. But today, the world can celebrate a win for global diplomacy. ■

Crop conundrum

The EU should decide definitively whether gene-edited plants are covered by GM laws.

When philosopher George Santayana said more than a century ago that those who do not learn from history are doomed to repeat it, he could have been predicting the European Union and its approach to genetically modified (GM) organisms.

As we report in a News story on page 319, the EU is dragging its feet over a legal ruling that could affect research and innovation for years to come. At stake is the use of gene-editing tools such as CRISPR-Cas9, which are revolutionizing biology. These techniques should theoretically trigger few safety alarms, yet they may be snared by the onerous legislation that has already added layers of bureaucracy to research involving conventional genetic engineering, and has slowed the cultivation of GM crops almost to a standstill in many nations.

The new tools can be applied to create mutations that could have occurred naturally, and leave no trace of foreign genes in the product.