ENERGY

How green is my future?

UN panel foresees big growth in renewable energy, but policies will dictate just how big.

BY JEFF TOLLEFSON

For centuries, humans have powered a growing world by extracting Earth's carbon-rich rocks, peat and liquids and burning them in ever greater amounts, but that trend is beginning to change. A report from the Intergovernmental Panel on Climate Change (IPCC), released on 9 May at a briefing in Abu Dhabi, suggests that an inevitable — if slow — shift towards specialized energy crops, sunlight, wind and other sources of renewable power will mark the next four decades.

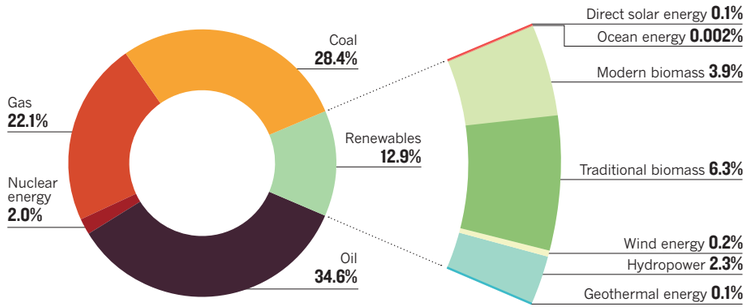
In addition to surveying published work on renewable energy potential, production, economics and policy, the IPCC conducted detailed socioeconomic modelling across 164 scenarios, both with and without policies intended to reduce greenhouse-gas emissions. The extent and type of development varies significantly depending on factors such as price and technological progress, and on government policies intended to reduce greenhouse-gas emissions. "Renewables will have a great future even without climate policies, but that does not necessarily lead to an emissions reduction," says Ottmar Edenhofer, chairman of the IPCC's working group on mitigation.

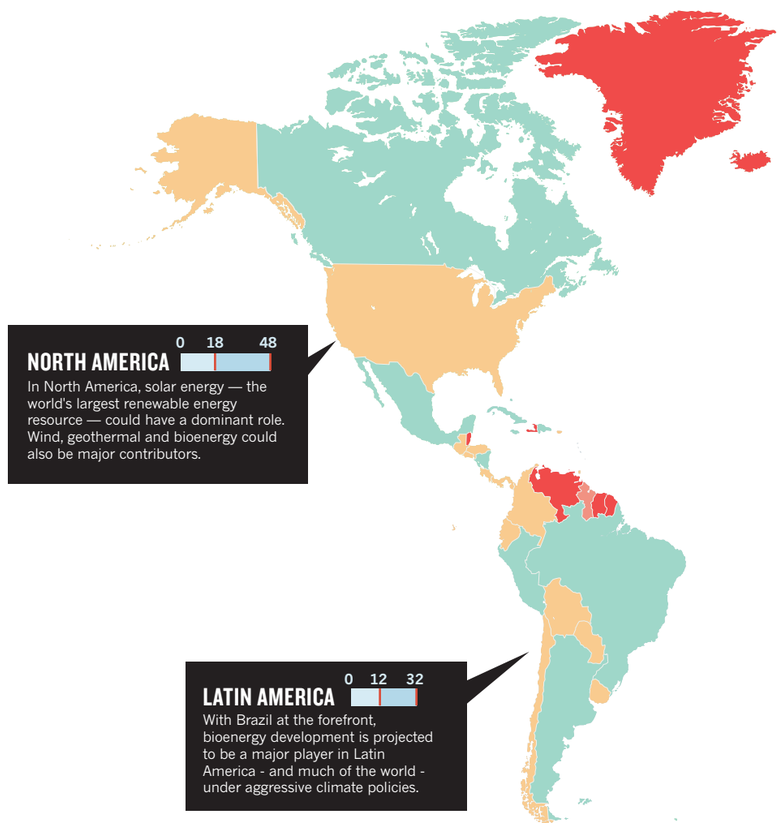
Renewable energy sources, excluding the burning of traditional biomass such as wood, make up roughly 7% of global energy production (see 'A small slice'), and the working group's *Summary for Policymakers* estimates that by 2050, production could rise to between three and more than ten times its current level. No renewable technology is projected to dominate, but bioenergy, solar energy and wind will be important in the energy mix (see 'The big three'). This shift towards renewable energy could reduce cumulative greenhouse-gas emissions by 220–560 gigatonnes of carbon dioxide, from a baseline estimate of 1,530 gigatonnes.

In all scenarios, fossil fuel will continue to have an important role for decades to come. The report says that falling prices for renewable energy will drive a gradual deployment of clean energy, but overhauling the global energy system represents a monumental task (see 'Planet renewable'). The IPCC says there are no technical barriers preventing large-scale deployment of renewable-energy systems over the next few decades. And even in 2050, none of the four main scenarios shows humanity tapping more than 2.5% of the accessible supply of renewable energy. ■

A SMALL SLICE

The world consumed around 492 exajoules (10^{18} joules) of energy in 2008, and renewable energy made up 12.9% of the total, and less than 7% if the burning of traditional biomass is excluded.

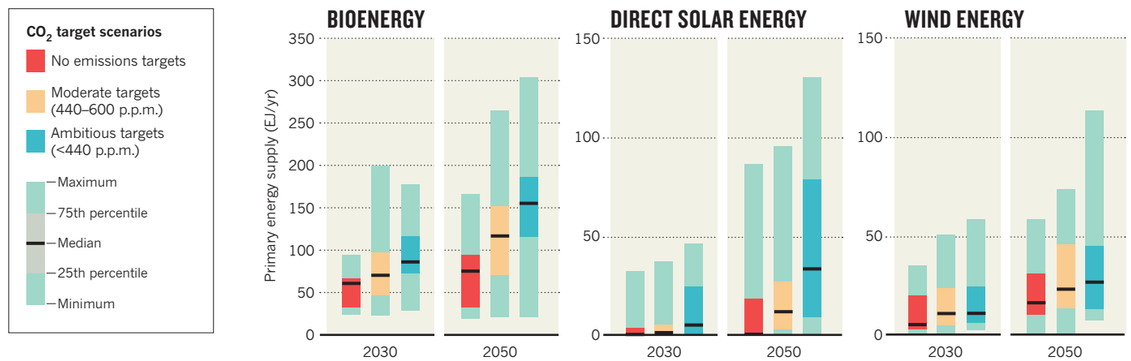




THE BIG THREE

Under the emissions scenarios studied by the Intergovernmental Panel on Climate Change, future renewable energy development varies with the level of ambition in halting the rise of atmospheric carbon dioxide concentrations. These rose to more than 390 parts per million (p.p.m.) in 2010. Biomass, solar energy and wind power look to remain the key renewable energy types.

SOURCE: IPCC



PLANET RENEWABLE

Four scenarios representing a range of policies and conditions show that by 2050 renewables could grow from 2008 levels of 32 exajoules per year to about 100–300 EJ/yr globally. Renewable energy could provide 15–77% of the global power supply. The lowest and highest projections in the four scenarios are estimated for selected regions.