Correspondence

Technology alone won't save climate

A dragon was buried at the Paris climate meeting (COP21): 'climate sceptics' disappeared. Now we face a second, equally formidable dragon: unreasonable optimism about 'new' energy technologies. This optimism supports economic-growth models driven by innovation, but depends on an unimaginable scale and rate of deployment.

Defeating the second dragon requires that we reconsider our habits of energy usage. Thirty years of engine-efficiency gains have been eclipsed by our preferences for ever-larger cars that are often 20 times heavier than the passengers — but these are habits, not needs.

We could continue to live well in rich economies with, say, one-quarter of the energy. For instance, we could run the boiler for one-quarter of the time and quarter our movement of mass — the total of all vehicles, freight and people, measured in tonne-kilometres. We could also make buildings and goods with half the material (without risking safety) and keep them for twice as long.

'Success' today is largely associated with derivative measures of increasing gross domestic product, profitability, speed or salary. Yet our value systems are based on integral measures of quality and stock: reputation, heritage, journeys and relationships. We need to expand the dialogue of climate mitigation to reflect these values. Challenging our habits of energy use should be the first priority of climate policy.

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Formalize recycling of electronic waste

India urgently needs a formal recycling policy for its mountain of electronic waste. Boosted by illegally imported discards from the West, this waste is expected to reach a total of around 30 million tonnes by 2020.

Western electronic waste comes largely from countries' weak legislation on its handling and management (G. Agoramoorthy and C. Chakraborty *Nature* **485,** 309; 2012). Although people in India informally recycle an estimated 95% of electronic waste for profit, the practice could soon be overwhelmed.

India's government proposed draft regulations for this waste in June 2015, to be formalized after a public consultation. These are already proving effective, but there is still a pressing need for national policy to alleviate damage to the environment. This would create employment and commercial opportunities, address health and safety concerns, and forge a path towards sustainability.

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International accord on open data

The accord *Open Data in a Big Data World* has been produced by representative bodies of global science collaborating as Science International (see go.nature.com/tpq3tu). It sets out the principles for maximizing benefit from the digital data revolution in shaping the future conduct of science.

Openness is the bedrock for benefit. Whole science systems, not merely the habits of researchers, need to adapt. It will be necessary for public funders of research to fund open-data management, for publishers to ensure that open data are deposited concurrently with the publication of derived scientific claims, for disciplinary societies to debate how their disciplines should adapt, and for universities to create incentives and support for open-data processes.

The accord recognizes potential pathologies: that the data deluge could overwhelm the open scrutiny of scientific claims, and that a countervailing trend towards privatization of knowledge could be at odds with the ethos of scientific inquiry and our need to use ideas freely.

It is crucial that standards of reproducibility are re-established for a data-rich age, and that the global scientific community commits to "intelligently open" science (see go.nature.com/dvgdfo). Digital technologies also provide a route to open science and open knowledge, where all sectors of society are involved in the co-design and co-production of actionable knowledge.

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Control wildlife pathogens too

Policies to control diseases caused by invasive alien species should be extended to cover endangered wild species, ecosystems and their services — not just humans, livestock and cultivated plants.

Of the 100 invasive alien species listed by the International Union for Conservation of Nature as the 'world's worst', one-quarter have environmental impacts that are linked to diseases in wildlife (M. J. Hatcher *et al. Front. Ecol. Environ.* **10,** 186–194; 2012). Identifying and managing this threat calls for coordinated interdisciplinary expertise.

Priorities are to collect baseline information on the distribution and population dynamics of pathogens, hosts and vectors; to determine the relative importance of invasion pathways; and to develop methods for predicting host shifts, pathogen–host dynamics and the evolution of alien pathogens (see also go.nature.com/ux4wpp).

This integrated strategy is geared towards the goals set by the Convention on Biological Diversity for managing invasives.

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**On behalf of 4 correspondents (see go.nature.com/upyjwi for full list).*

Weapons plutonium riskier above ground

Cameron Tracy and colleagues argue that the US Department of Energy (DOE) should conduct a new safety assessment of its nuclear Waste Isolation Pilot Plant (WIPP) before loading it with 34 tonnes of plutonium from dismantled nuclear weapons (*Nature* **529,** 149–151; 2016). We contend that the long-term risk of disposal in WIPP should be balanced against the benefits.

The reanalysis that the authors propose would take several years. During this time, Congress could well abandon the disposal programme. Leaving the plutonium above ground indefinitely would pose a much greater environmental threat than disposing of it in WIPP.

Disposal in WIPP would also offer a cheaper, simpler and more secure alternative (see go.nature.com/h81nb5) to the unaffordable plan to convert the plutonium to mixed oxide with uranium and burn it in nuclear-power plants.

There is a way to keep the disposal programme moving. The DOE proposes to put 6 tonnes of excess weapons-usable plutonium in WIPP from its Savannah River site. This will not markedly affect the WIPP inventory. Packaging that plutonium for disposal will take about 6 years (see go.nature.com/qhl8uf). Meanwhile, the DOE could redo the WIPP safety analysis and evaluate other disposal options for the 34 tonnes of plutonium (see, for example, go.nature.com/2cik4o), which will remain in bunkers at Savannah River and in Texas until a solution is found.

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