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China is surging ahead in the development of green technologies such as solar panels.

the aim of creating 1.5–1.8 million jobs and boosting economic growth through to 2020. South Korea has traditionally been at the forefront of innovative global industrial policy; just as it led newly industrializing countries in promoting labour-intensive manufacturing exports in the 1960s and 1970s, today it views green-sector growth as fostering industrial development and exports.

The American Recovery and Reinvestment Act included some \$78.5 billion to refit buildings, expand public transport and freight rail, construct a 'smart' electrical grid transmission system and expand renewable-energy supply. It was suggested that these green stimulus measures could create up to 2 million jobs over the next few years. However, the original plan also called for a comprehensive cap-and-trade system to limit carbon dioxide emissions and for the removal of fossil-fuel subsidies⁴. So far, these additional policies have failed to materialize. The American Clean Energy and Security Act, which outlines a cap-and-trade programme, has been stuck in the legislative line behind the National Health Care Act and is unlikely to get anywhere until late this year, when it will face fierce debate in the US Congress, competition from alternative bills and objections from lobbyists.

In the United States, the 'carrot' of subsidies for innovative energy technologies has long been more politically acceptable than the 'stick' of direct emissions policies. But subsidies do not seem to be effective on their own: despite generous tax cuts and public grants, US energy research and development declined from the late 1970s to the late 1990s⁵. Clearly the stick is also needed to provoke change. Without cap-and-trade policies and the removal of fossil-fuel subsidies, the current stimulus to private investment and job creation may be largely temporary.

Unfortunately, this could become the norm around the world. Without supportive policies to ensure the long-term economic viability of sustainable practices, some of the recent upsurge in global green spending by the G20 will ultimately go to waste.

Global action

Perhaps the biggest failing of the G20 has been in neglecting to address the economic and environmental vulnerability of the world's poor. As a result of the food and fuel crises that preceded the 2008–09 recession, the extra cost of lifting the incomes of the world's poor to the poverty line is around \$38 billion⁶. Nothing has been done to ameliorate this in any G20 spending plan. Small hydropower, biomass and solar photovoltaics already provide electricity, heat, water pumping and other power for tens of millions of people in rural areas of developing countries. If the G20 was to assist in increasing this capacity, it would help with both its environmental and poverty goals.

On the domestic front, G20 economies should follow the lead of South Korea and China and turn their green stimulus investments into a serious long-term commitment. The entire G20 should adopt environmental pricing policies, whether through cap-and-trade or through taxes, to ensure that carbon, pollutants, water and scarce ecological resources are no longer free. Perverse subsidies need to be removed, such as the \$300 billion that is spent annually on fossil fuels around the world. Cancelling these subsidies alone could reduce greenhouse-gas emissions by 6% and add 0.1% to global GDP⁷.

With such policies supporting the existing green stimulus packages, governments could increase G20 GDP by 0.7–2.2%⁷. Larger gains would occur if the G20 nations enacted

carbon-pricing policies in concert, inducing industry onto greener pathways rather than simply shifting its business from one country to another. International coordination of such policies could increase G20 GDP by 1.1–3.2%⁷.

Finally, the G20 countries should move towards a post-Kyoto global climate-change framework by agreeing on reasonable emissions commitments. Negotiations will be much easier among this smaller and more-coherent group than for the 192 participants of the United Nations Framework Convention on Climate Change, but still effective, given the G20's majority contribution to emissions.

It is imperative and urgent that the G20 takes on a global governance role in promoting a green recovery. The green stimulus initiatives undertaken by some G20 governments are laudable, but these investments alone cannot address the root global environmental and economic problems that make the world economy inherently unsustainable. The problems of energy insecurity, climate change, environmental degradation and global poverty will only worsen if we fail to green our current global economic-recovery efforts. ■

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1. Barbier, E. B. *A Global Green New Deal* (2009). Executive summary available at go.nature.com/M76qog
2. United Nations Environment Programme. *Global Green New Deal Policy Brief* (2009). Available at go.nature.com/Vy5zDt
3. Houser, T., Mohan, S. & Heilmayr, R. *A Green Global Recovery? Assessing US Economic Stimulus and the Prospects for International Coordination*. Policy Brief Number PB09-3 (Peterson Institute for International Economics and World Resources Institute, 2009).
4. Podesta, J., Stern, T. & Batten, K. *Capturing the Energy Opportunity: Creating a Low-Carbon Economy* (Center for American Progress, 2007).
5. Goulder, L. *Induced Technological Change and Climate Policy* (Pew Center on Global Climate Change, 2004).
6. World Bank. *Global Economic Prospects 2009: Commodities at the Crossroads* (World Bank, 2009).
7. United Nations Environment Programme. *Reforming Energy Subsidies: Opportunities to Contribute to the Climate Change Agenda* (UNEP, 2008).
8. Barbier, E. B. *A Global Green New Deal: Rethinking the Economic Recovery* (Cambridge Univ. Press, 2010).

Further reading accompanies this article online at go.nature.com/CZJK5w.

Correction

In 'Stop laser uranium enrichment' (F. Slakey & L. R. Cohen *Nature* 464, 32–33; 2010), the article should state that the average fuel cost for nuclear power in 2007 was US\$0.0045 per kilowatt-hour (not \$0.045 per kilowatt-hour). The other numbers and calculations are correct as printed.