CHATHAM HOUSE

briefing paper

Stuck in Transition: Managing the Political Economy of Low-carbon Development

Rob Bailey and Felix Preston

Energy, Environment and Resources | February 2014 | EER BP 2014/01

Summary points

- The task of decarbonization is essentially one of industrial policy, though not confined to the industrial sector. Governments must develop national transformation strategies, build effective institutions and intervene in markets to create and withdraw rents while avoiding policy capture.
- In poor countries, the principal challenges are low levels of government capacity and a lack of economic resources. For rich countries the challenge is primarily political: governments must pursue policies that are discounted by their populations and confront powerful incumbent interests.
- Bundling mitigation with existing policy priorities and highlighting co-benefits provides governments with a way to manage political risk. However, rapid decarbonization requires governments to make emissions reduction a policy priority.
- Piloting provides an important way for governments to work with the private sector, demonstrate success, overcome opposition and avoid policy deadlock. As such, piloting is more than a technical exercise; it is a political project.
- The costs of low-carbon technologies are falling fast and the green economy is expanding. Increasingly, the key challenge for governments – of avoiding high-carbon lock-in – is one of strategic choice rather than affordability.

Introduction

Climate change has been described as 'the greatest and most wide-ranging market failure ever seen,'[1] implying the need for government action on a similarly extraordinary scale. And if its worst impacts are to be avoided, the window for action is short. For what might reasonably be considered a good chance of keeping global warming below a rise of 2 degrees Celsius – the stated objective of the international community[2] – emissions must peak around 2020 and decline at a sustained rate of 3 per cent a year thereafter.[3]

The leaders in this effort should be the governments of developed countries, where capacities and resources – accumulated through decades of carbon-intensive growth – are greatest. However, the decarbonization of developed countries alone will not contain global warming. Developing countries now account for over half of global greenhouse gas (GHG) emissions. The 'brutal arithmetic' of climate change means that concerted action from governments in developed *and* developing countries is necessary: even if rich countries reduced their emissions to zero by 2030, the planned emissions of poorer countries remain enough to take the world beyond a 2-degree rise.[4]

On paper at least, governments – in developed and developing countries – are doing a huge amount. A 2012 review of 33 countries identified 286 laws related to climate change. The likely number of climate white papers, plans, roadmaps and policies from national and sub-national governments is an order of magnitude greater. Frustratingly however, these initiatives are not translating to emissions reductions at anything like the pace needed. Global emissions are rising at about 3 per cent a year, in perfect converse to the rate of decline needed after 2020, and consistent with the most pessimistic scenario of the Intergovernmental Panel on Climate Change (IPCC), in which global average temperature is expected to rise by more than 4 degrees Celsius by the end of the century.[5]

In short, government action to tackle emissions – across the developed and developing world – is falling far short of what is needed to avoid dangerous climate change. This paper argues that the central challenge of low-carbon transformation is essentially one of industrial policy. Drawing on lessons from earlier industrializations and recent attempts by governments to pursue green agendas, it sets out some of the main difficulties governments face in shifting their economies onto low-carbon pathways.

Challenges are analysed in three areas which together shape the domestic political economy: government capacity, economic conditions and political conditions. The paper considers how these factors vary according to context, in particular a country's level of development, and offers some suggestions for overcoming obstacles and improving government effectiveness.

Managing the transition: government capacity

Low-carbon policy is highly interventionist in nature. The extent of market failure and exigency of the problem mean interventions must be far-reaching in scope and deliver results quickly. Policies must go further than measures to price carbon through taxes or emissions trading, vital though this is. Additional interventions are required to promote new technologies through supply-side measures such as feed-in tariffs or subsidized finance, or demand-side measures such as technology standards, and to encourage and foster innovation. Regulation or efforts to improve access to information may be required to overcome behavioural barriers, particularly with regard to energy efficiency

1 Stern, N. (2006), 'Stern Review on the Economics of Climate Change', HM Treasury.

2 Copenhagen Accord, 2009, http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf.

3 The IPCC's most aggressive mitigation scenario, RCP2.6, predicts global average temperature rise by the end of the century in the 'likely' range of 0.9–2.3°C above pre-industrial levels (1850–1900), with a mean of 1.6°C. In this scenario emissions peak around 2020 and then decline at a rate of about 3 per cent a year. The next most aggressive mitigation scenario, RCP4, predicts global average temperature rise in the 'likely' range of 1.7–3.2°C with a mean of 2.4°C. The IPCC defines 'likely' as a probability of more than two-thirds. See IPCC (2013), 'Summary for Policymakers', in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, http://www.climatechange2013.org/images/uploads/WGI_AR5_SPM_brochure.pdf.

4 Romani, M., Rydge, J. and Stern, N. (2012), 'Recklessly Slow or a Rapid Transition to a Low-carbon Economy? Time to Decide', Grantham Institute.

5 IPCC (2013).

(for example landlords' reluctance to invest in building efficiency because the costs of inefficient buildings are borne by tenants). Multiple interventions in connected parts of the economy may be needed to overcome coordination failures (for example, when choreographed investments in power generation and distribution are required) or to manage the indirect effects of one policy on another.[6] Intervention at such scale and complexity, and on short timescales, means significant government capacity is needed.

Low-carbon policy and rent management

Fundamentally, low-carbon policy is concerned with management of economic rent.[7] Rents can be considered as profits above normal market levels, and by creating, removing or redistributing rents, governments can shift economic activity and investment towards low-emission outcomes. Sources of rent include subsidies, tax breaks and preferential tariffs for low-carbon activities, or regulations that increase costs for high-carbon activities, such as a carbon price.

Low-carbon policy is therefore a form of industrial policy, though not confined to the industrial sector. As Dani Rodrik notes, 'industrial policy is not about ***industry*** *per se*. Policies targeted at non-traditional agriculture or services qualify as much as incentives on manufactures.'[8] In the case of low-carbon transformation, objectives are economy-wide and will include transport and buildings in addition to industry, agriculture and services. Nevertheless, despite the broader sectoral focus, the process of low-carbon rent management is analogous to earlier processes of industrialization, where developmental states intervened to increase profitability among new, favoured manufacturing sectors and decrease the profitability of old, lower-value-added activities. The literature examining these past industrializations identifies a multitude of policy measures used by governments in different countries, with varying degrees of success. Importantly, success appears to have had less to do with the precise form of interventions than with the ability of governments to manage rents effectively.[9] Successful governments used a wide variety of policies to 'govern the market' but all possessed the capacity to do so, including:[10]

- Ability to create or withdraw rents as needed and resist capture by special interests;
- Ability to monitor enterprises and markets, revise policies accordingly and establish service agencies to support enterprises where necessary;
- Capability to develop, through inclusive processes, a national transformation project and translate this into discrete plans, targets and policy measures;
- Capacity to establish and enforce appropriate rules for market regulation and investment.

This is a daunting list of capacities, capabilities and abilities, particularly for the poorest countries where levels of government capacity are invariably lower (Table 1). In these cases, the scale of the challenge faced by government cannot be overstated. Ministries are understaffed and suffer from a chronic lack of economic resources. Technical skills and expertise are likely to be limited. Data are scarce and the processes and institutions needed to collect and analyse data may be absent. The private sector is typically undeveloped and fragmented, with much economic activity occurring within the informal economy, beyond the reach of market interventions. Basic market institutions and regulatory frameworks are likely to be weak.

6 See, for example, Hepburn, C. (2010), 'Environmental Policy, Government and the Market', *Oxford Review of Economic Policy*, Vol. 26, No. 2, pp. 117–36; and Fankhauser, S. (2012), 'A Practitioner's Guide to a Low-carbon Economy: Lessons from the UK', Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment, London School of Economics.

7 Schmitz et al (2013), 'Rent Management – The Heart of Green Industrial Policy', IDS Working Paper 418, Institute of Development Studies, https://www.sussex.ac.uk/webteam/gateway/file.php?name=1-november-2013---rent-management-the-herat-of-green-industrial-policy.pdf&site=25.

8 Rodrik, D. (2007), 'Normalizing Industrial Policy', paper prepared for the Commission on Growth and Development, Harvard University, http://www.hks.harvard.edu/fs/drodrik/Research%20papers/Industrial%20Policy%20_Growth%20Commission_.pdf.

9 See, for example, Wade, R. (1990), *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*, Princeton University Press; Amsden, A. (1989), *Asia's Next Giant: South Korea and Late Industrialization,* Oxford University Press; Evans, P. (1995), *Embedded Autonomy: States and Industrial Transformation*, Princeton University Press.

10 See, for example, Altenburg, T. (2011), 'Industrial Policy in Developing Countries: Overview and Lessons from Seven Country Cases', Discussion Paper, German Development Institute, Bonn.

Table 1: Selected government capacity indicators for high-, middle- and low-income countries

	Scale	Indicator	High	Middle	Low
Doing* Business	Ranking 1 (greatest ease) to 189 (most difficult)	Ease of doing business	43.3	105	150.9
Worldwide Governance Index	Score -2.5 (least) to 2.5 (greatest)	Government effectiveness	1.08	-0.36	-1.07
		Voice and accountability	0.77	-0.23	-0.91
Transformation Index**	Score 1 (least developed) to10 (most developed)	Consensus-building	7.12	5.43	4.33
		Steering capability	6.80	5.15	3.97
		Market organization and competition	8.60	6.09	4.47
		Rule of law	7.24	5.18	3.90
Corruption Perceptions Index	Score 0 (most corrupt) to100 (least corrupt)	Corruption perceptions	64.88	36.15	25.85
Global Competitiveness Index	Score 1 (least competitive) to 7 (most competitive)	Favouritism in decisions of government officials	3.82	2.88	2.78
		Transparency of government policy-making	4.67	3.97	3.70
		Judicial independence	5.01	3.35	2.87
		Wastefulness of government spending	3.72	3.00	3.04

* Country rankings are averaged across income groups.

** The Bertelsmann Transformation Index (BTI) excludes countries with consolidated democratic systems and well-advanced economies, so HICs are limited to higher-income resource producers and transition economies.

Sources: Chatham House analysis based on World Bank, Doing Business 2014; World Bank, Worldwide Governance Index (WGI) 2012; Bertelsmann Stiftung, Bertelsmann Transformation Index (BTI) 2012; Transparency International, Global Corruption Perceptions Index (CPI) 2013; World Economic Forum, Global Competitiveness Index 2013–2014. Average scores calculated according to World Bank Income Group country classifications. Table adapted and updated from Altenburg (2011).

With the minimum of data, staff and resources, governments in low-income countries (LICs) must create an enabling environment for investment while steering it towards industries that can, depending on factor endowments, sustain growth in an increasingly competitive global marketplace. All this would need to be achieved with the new constraint of avoiding significant rises in emissions – something never done before.

Government capacity in middle-income countries (MICs) is likely to be higher. Ministries are generally better resourced, with more staff and higher levels of expertise and training. Data environments, though imperfect, are more favourable. Furthermore, many MICs are currently undergoing industrializations and have developed or are experimenting with the processes and governmental structures necessary to manage rents effectively.

In these contexts, where economies are growing rapidly and rates of investment are high, the challenge for governments is to steer the process of transformation towards low-carbon outcomes and avoid high-carbon lock in. China has perhaps been the most successful MIC in this regard: despite being only the 79th richest country in the world in per capita income terms,[11] it is the largest investor in renewable energy[12] and a market leader in clean technologies: in 2010, there were four Chinese companies in both the top ten wind and top ten solar PV manufacturers.[13] However China's focus on installation rather than output means the full potential of this investment is not yet realized: much capacity remains unconnected to the grid and operating efficiency is only half that of the United States, for example.

Governments in developed countries face far fewer capacity constraints. This is demonstrated not only by the

11 Based on 2012 GDP per capita in current US dollars from World Bank Development Indicators.

12 UNEP (2013), 'Global Trends in Renewable Energy Investment 2013', Nairobi: United Nations Environment Programme, http://www.unep.org/pdf/GTR-UNEP-FS-BNEF2.pdf.

13 BTM (2010), *International Wind Energy Development – World Update 2010,* http://www.businesswire.com/news/home/20110328006651/en/BTM-Consult-Releases-Wind-Report-World-Market.

extent of their interventions but also by the ambition of initiatives such as cap-and-trade schemes or legislation to enhance the credibility of long-term emissions targets.

Nevertheless, progress in developed countries remains deeply disappointing. The creation and withdrawal of rents – whether green or not – creates winners and losers, and the private sector will mobilize to seek new rents and protect existing ones accordingly. It is arguably in this aspect of government capacity – the ability to resist capture by special interests – that developed-country governments are most deficient.

Rent-seeking and policy capture

As Box 1 shows, rent-seeking – whereby the private sector seeks to capture policy-making in order to obtain new rents or protect existing ones – may occur through a variety of means. Bribery is the most obvious, but other legal forms of rent-seeking behaviour include the provision of jobs to politicians and senior bureaucrats through 'revolving doors', political donations and the provision of hospitality. For example, the US fossil fuel sector is estimated to have spent $500 million on political donations and lobbying activities during the 2010 mid-term

Box 1: Rent-seeking, capture and EU biofuel policy

European road transport is exempt from the EU Emissions Trading Scheme. Instead, the EU has issued a number of directives to reduce the emissions intensity of transport fuels and vehicles, and increase the use of renewable transport fuels. The 2009 Renewable Energy Directive mandates that 10 per cent of all road transport energy come from renewable sources – essentially biofuels – by 2020. In addition to the mandate, member states have also implemented a variety of subsidies and tax breaks to incentivize biofuel production. The EU has also maintained tariffs on biofuels produced overseas, limiting imports of cheaper and often more environmentally friendly fuels. The cost of these measures is currently estimated at around €6 billion a year, rising to €12 billion a year by 2020.

The renewable fuels industry is the most obvious beneficiary of these rents, but it has organized with petroleum companies, for which biofuels are complementary to their downstream businesses and preferable to disruptive technologies such as electric vehicles, and the agriculture lobby, which benefits from increased crop demand and higher farmgate prices.

Unfortunately the environmental benefits of biofuels are questionable. The high cost and low energy content of biofuels mean they are at best an expensive way of reducing emissions: typical abatement costs for agricultural biofuels are several hundred dollars per tonne of carbon dioxide equivalent – an order of magnitude higher than estimates of an appropriate cost of carbon. This compares unfavourably with alternative mitigation strategies in the transport sector, most notably measures to improve vehicle efficiency, which can yield abatement *profits* as motorists are rewarded for their emissions reductions with lower fuel bills.

Moreover the latest science indicates the picture is worse once emissions from indirect land-use change (ILUC) – arising from the remote expansion of the agriculture frontier into high-carbon-stock areas such as forest and peatland – are included in calculations of biofuel GHG savings. Accounting for these effects increases the abatement costs for ethanol further and leads to the awkward conclusion that biodiesel from edible oil – the most widely consumed biofuel in Europe – produces more emissions than fossil diesel.

Unsurprisingly, an initial proposal by the European Commission to account for ILUC emissions when calculating whether biofuels meet minimum GHG reduction requirements met with fierce opposition from biofuel interests, and the proposal was swiftly withdrawn. Considerable lobbying efforts are now being directed towards the inclusion of a new target in the EU's 2030 climate and energy package.

Sources: Bailey, R. (2013), 'The Trouble With Biofuels: Costs and Consequences of Expanding Biofuel Use in the United Kingdom', Chatham House; and Charles, C. et al. (April 2013), 'Biofuels – At What Cost? A Review of Costs and Benefits of EU Biofuel Policies', International Institute for Sustainable Development, www.iisd.org/gsi/.

elections.[14] More subtly, business may try to influence policy-making by providing expertise and analysis to governments, or publishing and funding research.[15]

Rent-seeking and policy capture have dogged European low-carbon policy-making. Early lobbying from European businesses in favour of emissions trading (and against a carbon tax) was primarily motivated to avoid costs (of a tax) and secure rents (through the grandfathering of permits);[16] a similar pattern of capture was evident in abortive attempts to introduce a cap-and-trade scheme in the United States.[17] The efficacy of the resultant EU Emissions Trading Scheme (EU ETS) has been severely undermined by successive rounds of corporate lobbying to limit the auctioning of permits and prevent action to deal with the current surplus of permits through 'backloading' or a carbon floor price. While it may still be too early to label the EU's flagship mitigation policy a failure, it certainly has yet to become a success: the glut of permits has meant that polluting industries have met their obligations by banking surpluses rather than undertaking mitigation, and carbon prices of a few euros per tonne provide little incentive for low-carbon investment. European biofuel policy provides a further example of policy capture by well-organized special interests resulting in considerable economic cost and questionable environmental benefits (see Box 1).

In developing countries, weaker governance, low transparency and low levels of public-sector pay mean rent-seeking is more likely to occur through bribery, though the implications for low-carbon policy-making may be little different. In a limited sense, the challenge faced by governments in the poorest countries may be smaller. Undeveloped private sectors and low industrial incumbency mean, first, that interests are less well organized, less well resourced and less effective at capturing policy; and, second, that the focus of rent management is likely to be on the creation of new rents rather than the withdrawal of existing ones, and therefore less likely to attract resistance. An exception is the rents arising from fossil fuel subsidies; as Box 2 shows, many developing-country governments are now grappling with the challenge of reforming these.

Box 2: Fossil fuel consumption subsidies in developing countries

Fossil fuel consumption subsidies are estimated to have cost developing-country governments around $400 billion in 2011.[a] These policies subsidize carbon emissions, tilt the playing field against clean energy and discourage investments in energy efficiency.

Removal of fossil fuel subsidies is an essential precondition for low-carbon development, but attempts at reform may attract significant resistance. Some of the largest rents accrue to influential industrial interests that lobby to defend them. At the household level, the benefits of subsidies flow overwhelmingly to wealthy and middle-class populations,[b] creating a powerful constituency against reform. And although poor households receive little of the rent, the withdrawal of price support may affect them disproportionately as energy accounts for a greater share of their expenditures. As such, subsidy reform can attract resistance across society. Public resistance can be mitigated through social transfers to neutralize the impacts on poorer households, but governments often lack the necessary capacities to do so.

a Based on 42 countries for which data are available. Whitley, S. (2013), 'At Cross-purposes: Subsidies and Climate Compatible Development', Overseas Development Institute, London.

b For example, the International Monetary Fund estimates that on average the richest 20% of households in low- and middle-income countries capture 43% of the value of subsidies – six times as much as the poorest 20%; see IMF (2013), 'Energy Subsidy Reform: Lessons and Implications', International Monetary Fund, Washington, DC.

14 See the Sierra Club website: http://content.sierraclub.org/beyondoil/dirty-money.

15 Helm, D. (2010), 'Government Failure, Rent-seeking, and Capture: The Design of Climate Policy', *Oxford Review of Economic Policy*, Vol. 26, No. 2, pp. 182–96.

16 Ibid.

17 Grandfathering was used in the 2009 Waxman-Markey bill as a means to reduce resistance from American industry and secure passage through the House of Representatives.

Policy learning and piloting

The challenge of resisting policy capture is complicated by the unavoidable need for governments to work with the private sector on a shared project of low-carbon transformation. An ability to cooperate closely with the private sector in what Rodrik has described as 'a discovery process … where firms and the government learn about underlying costs and opportunities and engage in strategic coordination'[18] while resisting policy capture is perhaps the defining characteristic of successful developmental states. Successful governments worked with firms on shared endeavours, experimenting with policies, monitoring progress and fostering success, yet being prepared to withdraw support from underperforming or failing initiatives.

China's remarkable economic progress and its recent success in renewable energy follow from the state's effective management of rents, but also its approach to policy learning. For the last three decades, economic transformation in China has followed a process of experimentation in which central government has encouraged innovation among local governments and state enterprises, selected successful solutions and fed this back into national policy-making. This *modus operandi* has helped to manage policy risks and support a flexible and adaptive approach to rent management. And by demonstrating success, it has helped to overcome entrenched interests and avoid policy deadlock.[19]

Many developed countries, including the United States and Germany (partly as a result of their federal organization and devolved responsibilities), have long experience of sub-national industrial and environmental policies that sometimes graduate to national level. In the UK piloting and phased policy introduction is a relatively recent phenomenon, but is now considered normal practice. A UK commission on the use of pilots in 2003 described it as 'an important innovation' and recommended that the UK emulate the United States in piloting all major policy changes.[20]

In general, piloting has a number of attractions for governments:

- It provides a space for policy innovation, from where failure can be discarded and success scaled up to the national level or rolled out to other areas;
- It is less politically risky to pursue untested, transformative change at the local level, while national reforms that have been proven to work through piloting may face less resistance;
- Pilot areas may act as beacons within countries and a focus for international cooperation and investment.

Piloting is being used for low-carbon policy learning in a number of countries. The UK has a series of 'low carbon zones' in its major cities. The latest phase of China's mitigation policy learning is the implementation of Low Carbon Pilot Areas – zones with distinct institutional, regulatory and incentive arrangements designed to accelerate low-carbon development and generate scalable solutions for the wider economy. In Ethiopia, the government is currently examining opportunities to develop low carbon zones analogous to the Low Carbon Pilot Areas being implemented in China. One of the principal attractions for the government is the opportunity to cascade the national mitigation strategy down to the sub-national level, and provide an integrative framework which links it to local development plans.

While the right approach and pilot design will depend on country characteristics, a few common lessons emerge from previous experience. In terms of scale, pilot areas should be large enough to include a range of economic sectors and a mix of rural and urban areas (to generate critical mass and to avoid 'leakage'). Perhaps more importantly, success in a larger area with some diversity is more likely to offer relevant lessons for other regions or at the national level. Pilot areas should have sufficient capacity and autonomy to

18 Rodrik, D. (2009), *One Economics, Many Recipes: Globalization, Institutions, and Economic Growth*, Princeton University Press.

19 Heilmann, S. (2008), 'Experimentation under Hierarchy: Policy Experiments in the Reorganization of China's State Sector, 1978–2008', Centre for International Development, Harvard University.

20 UK Cabinet Office (2003), *Trying It Out – The Role of Pilots in Policy-Making*, http://www.civilservice.gov.uk/wp-content/uploads/2011/09/Trying-it-Out_tcm6-36824.pdf.

experiment with policy-making. These are both significant challenges since capacity constraints are often a major issue in developing countries, and empowering new or existing institutions will be resisted by some in the centre.

Local government capacity

Where local governments have sufficient autonomy and capacity, distinct regions or provinces may provide opportunities for policy learning, particularly in large countries where socioeconomic conditions and endowments (and therefore the low-carbon development context) vary. This is evident in China, where effective provincial governments have been set mitigation guidelines, targets and incentives by the central government and provided with considerable autonomy in how these are pursued. This approach encourages policy experimentation and allows national mitigation policies to be tailored to local contexts. It has achieved impressive results in many provinces, perhaps most notably Shanxi, which, despite the predominance of coal production and heavy industries, exceeded national energy efficiency targets where other provinces failed to do so.[21]

Local governments may also choose to pursue low-carbon development independently of central government. In the United States, considerable autonomy and high capacity among state governments have allowed a number of them to pursue mitigation actions in the absence of federal policy. At the municipal level, numerous cities in developed and developing countries are pursuing their own low-carbon plans.

Government capacity at the local level is likely to be lower than at the national level, where skills and expertise are often concentrated within ministries. As a means to address this gap, local governments have established international networks to collaborate, build capacity, share knowledge and demonstrate success. Notable among these are the C40 Cities Climate Leadership Group – a network of 58 megacities from the developed and developing world – and the ICLEI Local Governments for Sustainability network, which includes nearly 1,100 cities and towns from 84 countries. Although the politics of climate change, in particular questions of responsibility and how global effort should be shared, remains a divisive issue for national governments, the political conditions for cooperation clearly exist at the sub-national level.

Finally, local government capacity is an enabler for low-carbon development, but it is not necessarily a prerequisite. In India the central government is unable to rely on comparably less effective and reliable state governments to implement energy efficiency measures. This has led it to bypass these structures and target energy consumers directly through market measures, with some success.[22]

Central government relations

At the level of central government, low-carbon policy-making and implementation are typically located within environment ministries, usually among the weakest departments in government. As a consequence, policy-makers may struggle to push low-carbon strategies laterally towards other ministries and achieve buy-in and ownership across the whole of government. That, in turn, prevents low-carbon development from becoming a national transformation project in a manner comparable to successful industrializations of the past. Frustratingly, in developed countries resistance is often greatest from those ministries most fundamental to the achievement of such an endeavour, such as finance or trade and industry. This resistance has increased during recent years of recession as unemployment numbers and deficit figures – priorities for these ministries often viewed as conflicting with low-carbon objectives – have assumed greater political significance, as described in the next section.

Countries have had to innovate to overcome these problems. For example, China undertook a series of institutional and governmental reforms to gradually increase the power of environmental policy-making within central government, culminating in the establishment of the

21 Success throughout Shanxi was not uniform, however. The municipality of Linfen, where local government was weak and beset by leadership changes throughout the implementation period, performed poorly. See Harrison, T. and Kostka, G. (2012), 'Manoeuvres for a Low Carbon State: The Local Politics of Climate Change in China and India', Development Leadership Programme, Government of Australia.

22 Harrison and Kostka (2012).

National Energy Commission (NEC) in 2010. The NEC has 'super ministry' status, providing it with the power to influence other line ministries, and reports directly to the State Council.[23] In Zambia, the cross-departmental Climate Change Technical Committee, responsible for taking forward climate policy, is located within the Ministry of Finance. The Ethiopian Environmental Protection Authority, initially charged with developing and implementing the national climate change strategy, was vested with considerable power by being placed under the direct authority of the Office of the Prime Minister.

Economic conditions

The economic conditions within a country have significant implications for the political economy of low-carbon development. Issues relating to resource endowments and economic structure are instrumental in shaping sectoral interests and the distributional impacts of rent management policies, while the size and strength of the economy determine the economic resources available for low-carbon development and shape the political space available to politicians wishing to pursue it. Finally, infrastructural deficits in poor but fast-growing economies present opportunities to invest in low-carbon alternatives and avoid lock-in.

Resource endowments

National endowments of fossil energy present a barrier to action on low-carbon development. First, fossil fuel production can provide governments with a valuable source of revenues which they may be extremely reluctant to 'choke off'. OECD governments receive about $200 billion a year in revenue from upstream oil and gas production. In Russia the revenue amounts to $150 billion – 28 per cent of total government revenue. Among OPEC governments it is $600–700 billion a year.[24]

Second, these endowments have implications for the cost of low-carbon development. There could be high opportunity costs for countries with significant recoverable fossil fuel reserves if these are to remain in the ground, and for those that use their reserves to suppress domestic energy prices, the relative cost of renewable energy is likely to be particularly high. Conversely, for countries with high fossil fuel import dependency the costs of mitigation are likely to appear more favourable. This is particularly so for landlocked countries where import costs are higher, and for countries with high renewable energy potential. A key justification for landlocked Ethiopia's ambitious plans for zero emissions growth is the opportunity to avoid increasing dependency on oil imports and instead harness its endowments of hydro, biomass, solar and wind potential. But in neighbouring Kenya, recent discoveries of oil and gas have raised concerns that government commitment to low-carbon development may wane.

Third, fossil fuel endowments tend to foster interest groups opposed to low-carbon transformation. In Poland, coal is responsible for around 90 per cent of heat and electricity generation and the coal industry employs over 100,000 people. This goes some way to explaining Poland's frequent blocking of EU climate initiatives – most recently its opposition to proposals to increase the EU's emissions reduction target.[25] In the United States – home to the world's largest coal reserves – the coal industry has been a principal opponent to federal action on climate change.

China is the world's biggest producer and consumer of coal, it generates around 80 per cent of the country's energy needs and the industry directly provides over four million jobs and supports millions more.[26] The world's top five coal-fired electricity producers are Chinese companies which, alongside the large coal-mining companies, have close ties to the state and considerable influence. Installed capacity is increasing rapidly: as of July 2012, there were 363 new plants proposed, representing 40 per cent of worldwide planned expansion. China may be the world's biggest investor in renewables, but it is also the world's biggest investor in coal.

23 Ibid.

24 OECD estimates from a lecture by Angel Gurría, OECD Secretary General, London School of Economics and Political Science, London, 9 October 2013.

25 'Poland pits itself against EU climate promises', Reuters, 1 October 2013, http://uk.reuters.com/article/2013/10/01/us-eu-climate-idUKBRE9900UU20131001.

26 Rui, H., Morse, R. K. and He G. (December 2010), 'Remaking the World's Largest Coal Market: The Quest to Develop Large Coal-power Bases in China', Program on Energy and Sustainable Development, Stanford University, working paper, http://iis-db.stanford.edu/pubs/23050/WP_98_Rui,_He,_Morse_China_Coal_Power_Bases_DEC10.pdf.

The extent to which the Chinese government is able to rein in the expansion of coal-fired power or decarbonize it through carbon capture and storage (CCS) is arguably the most important question for global emissions growth.

The cost of renewables

Renewable energy costs are falling fast. The most dramatic declines have occurred in solar PV, where the costs of an average panel have fallen by three-quarters in four years.[27] Solar energy is now at or approaching grid parity in many countries. In a 2013 survey of 25 markets, Deutsche Bank estimated residential solar to be competitive in 11 on an unsubsidized levelized cost of electricity (LCOE) basis,[28] and that a further 10 to 20 markets had the potential to become competitive in the next three years.[29] In some markets, including the shale-dominated US, electricity utilities are investing in large-scale solar projects rather than flexible gas plants.[30]

The costs of wind power are falling more slowly but from a lower baseline – in a number of countries including Canada, China, Italy, Japan, Spain and the UK, utility-scale wind is already competitive with gas on an LCOE basis and is now nearing wholesale electricity prices.[31] As its market penetration increases and arrays become more geographically dispersed, the problem of intermittency declines and wind power begins to assume base-load characteristics.

Some of the most exciting applications for renewables exist in the poorest countries where the potential is often high but access to electricity low. In particular, solar power is especially suited to models of distributed generation, providing the opportunity to generate electricity in marginalized areas and avoid lock-in to costly and inefficient grid infrastructures.

Structure of the economy

Decarbonization policies create costs for high-emitting sectors. However, for costs to translate into loss of competitiveness, the sectors must be subject to international competition. For example, power generation, where the costs of decarbonization are high, is subject to minimal international trade and so not subject to direct competitiveness concerns. Vulnerable sectors tend to be heavy industries such as steel, cement and chemicals;[32] therefore economies weighted towards these sectors face greater short-term challenges and governments face greater resistance. That said, resistance is certainly not confined to heavy industries. While power generators may be sheltered from foreign competition, low-carbon policies still threaten to disrupt their business models and increase costs. The asset values of oil, gas and coal companies are similarly threatened by policies to price carbon or favour renewables. The European automotive industry has lobbied effectively against EU legislation to reduce vehicle emissions, despite the fact that it would apply to all cars sold in the EU, whether from European or non-European manufacturers, on the basis that proposals would increase costs or simply were too technologically ambitious.

While developed-country governments struggle to decarbonize transport and energy sectors, the process of 'de-industrialization' and the migration of industry to a number of emerging economies have made the task of emissions reduction considerably easier for rich countries. Conversely, the migration of industry from developed to emerging economies has made the mitigation challenge greater for the latter, which now face the task of decarbonizing industries that continue to supply consumption in high-income countries (HICs). This has prompted some experts to call for emissions to be

27 Channell, J. et al. (2013), 'Energy Darwinism: The Evolution of the Energy Industry', Citi GPS, https://www.citivelocity.com/citigps/ReportSeries.action?recordId=21.

28 LCOE is a measurement of the cost of electricity to ensure comparability between different sources with different capital and marginal cost characteristics. LCOE essentially calculates net present value of capital, operating and fuel costs over the lifetime of the installation and divides this by the amount of electricity generated over this period to provide a cost per kilowatt hour.

29 Shah, V., Booream-Phelps, J. and Min, S. (2013), 'Solar Q2 Preview: Improving Fundamentals, Outlook', Deutsche Bank Markets Research, http://www.bizzybees.eu/wp-content/uploads/2013/08/DB-Solar-Industry.pdf.

30 Channell, J. et al. (2013).

31 Channell, J. et al. (2012), 'Shale & Renewables: A Symbiotic Relationship', Citi Research, https://ir.citi.com/V64m%2fJzQp7Cw7CK1DoVmgnwsBenhBaN3tlN8%2bleMHnrAEUk2htelBVPDYckdYxvEG9huSEzWXR8%3d.

32 Fankhauser (2012).

measured, and managed, on a consumption rather than production basis.[33]

In pre-industrial LICs, economies are often dominated by agriculture. Industrial emissions are low, and consequently the objective of climate policy is not to decarbonize existing capacity but to avoid lock-in to carbon-intensive activities and infrastructure. Where they exist, fossil fuel subsidies will significantly undermine attempts to 'leapfrog' onto a low-carbon pathway.

The private sector in LICs is usually weak, fragmented and poorly organized, and thus less likely to present resistance than in either HICs or MICs.[34] Mitigation is likely to consist principally of sequestration opportunities in climate-smart agriculture and avoided deforestation and reforestation, but LICs require significant financial assistance to realize these opportunities.

Wealth and growth

HICs have the greatest capacity to invest in low-carbon efforts: government budgets are larger, capital markets are deeper and more liquid, and wealthier populations can more easily absorb the pass-through of mitigation costs. However, HICs may be underperforming in this regard: recent data show that developing countries now account for 45 per cent of total investment in renewable energy, with China, India and Brazil respectively first, seventh and ninth in the overall country rankings.[35]

HIC underperformance is partially attributable to low growth and budgetary constraints: in 2012, developed-country investments collapsed by 29 per cent on the previous year as governments sought to cut public spending by withdrawing subsidies.[36] Stagnant growth and flat energy demand in HICs mean renewables must displace fossil fuels in the energy mix, a process likely to encounter resistance from incumbent generators and limited by the retirement rate of existing installations.

The dynamic in MICs is different. Strong economic growth and rapidly expanding energy demand are continually creating room for new renewable capacity that need not displace existing installations. Moreover, demand growth is higher and resistance lower. As such, the rebalancing of renewable capacity from North to South is likely to continue.[37]

More generally, developing economies, whether MICs or LICs, are likely to face relatively greater infrastructural deficits than developed economies, not only in the energy sector but also in other high-emission sectors such as transport or buildings. Addressing these deficits provides the opportunity to invest in low-carbon and climate-resilient infrastructure and avoid lock-in.

Finally, there are crucial linkages between economic conditions and political conditions. In addition to room for new renewable capacity, economic growth also creates political space for low-carbon policy-making. However, the converse is also true: as developed-country economies slipped into recession following the 2008 financial crisis, public support for climate policy declined, since populations focused increasingly on immediate concerns such as household expenditures and job security. These dynamics are considered more fully in the next section.

Political conditions

National political conditions are inevitably highly context-specific, depending upon history, culture, political institutions and external factors, among other things. Whether their legitimacy is based upon election, patronage or the delivery of inclusive development, politicians are likely to prioritize policies through which they expect to gain or maintain support from political constituencies. These policy priorities vary by country and by level of development, as demonstrated below, but the subordination of mitigation to other concerns appears to be a consistent pattern. Politicians calculate that they can 'buy' more political support from acting on other issues, or that acting on climate presents too much downside risk.

33 See, for example, Helm, D. (2012), *The Carbon Crunch: How We're Getting Climate Change Wrong – And How to Fix It*, Yale University Press.

34 However, it is often the case that a few favoured businesses enjoy close ties to the state and are likely to wield disproportionate influence as a result.

35 UNEP (2013).

36 Ibid.

37 Crooks, E. (2013), 'Emerging economies lead switch to renewable energy', *Financial Times*, 26 June.

High-income countries

In a number of HICs, climate policy was in the ascendancy in the run-up to the 2009 Copenhagen climate conference. In the EU, the drift towards coalition government in many member states had increased the value of the 'green' vote, incentivizing mainstream parties to offer concessions on this issue.[38] A raft of climate policies was passed in 2008 with the objective of cementing European climate leadership in advance of the negotiations. However, the spectacular failure of the Copenhagen conference and subsequent global recession drained climate change of its political value.

Economic difficulties in most HICs have been particularly corrosive. The economic argument for action on climate change made in the 2006 Stern Review, that early action will reduce long-run costs, has lost traction in the wake of the 2008 financial crisis. Although public awareness of climate change is generally high, near-term costs and long delays before the benefits of action (or the costs of inaction) become apparent mean that climate policy is not a vote winner among most sections of society. Declining real incomes have focused the attention of electorates on immediate concerns such as household expenditures and job security, with which climate policies – that may increase household energy bills or threaten the competitiveness of certain sectors of the economy – may not be easily compatible. Special interests have often emphasized these concerns in their lobbying and public communications. For example, a major campaign from the US coal lobby has stressed the threat to American jobs and household energy bills presented by current climate policies.

Political narratives in developed countries have simply not kept pace with developments in low-carbon industries, where the costs of many technologies have collapsed and economic performance has been strong.[39] With short-term economic concerns dominating political agendas, political leadership on climate change is a risky proposition that could require the exhaustive expenditure of political capital. The UK Chancellor of the Exchequer, George Osborne, has made clear that the UK should not lead on climate action.[40] President Barack Obama chose not to pick a fight on climate policy in the United States until his second term, when he was no longer seeking re-election. In Australia, the previous Labor government's introduction of a fixed carbon price despite strong opposition from the mining industry became something of a millstone for the Labor party as the 2013 election approached. The opposition had pledged to repeal the policy, describing it as an economic 'wrecking ball', warning that industrial areas would become 'ghost towns', and positioning the election as a 'referendum on the carbon tax'. Faced with collapsing support in the polls, the prime minister, Julia Gillard, was replaced by her predecessor, Kevin Rudd, who swiftly announced plans for the carbon price to float down and large cuts to government climate change programmes. However, the election saw a change of government, which soon confirmed plans to abandon the fixed carbon price and dismantle a number of climate change bodies.

The reluctance of the political class to prioritize low-carbon policy is likely to deepen public ambivalence by confirming that climate change is not a major concern. Electorates might reasonably assume that, were the risks high and the case for immediate action strong, governments would attach more importance to the issue and politicians be prepared to take more of a stand.

Where HIC governments have pursued radical reform of their energy infrastructures, the political imperative has not been climate change. Following the 2011 Fukushima disaster, the sea change in public attitudes towards nuclear energy in Japan and Germany precipitated rapid decommissioning of nuclear plants – responsible for 25 per cent of electricity generation in Germany and 29 per cent in Japan before the crisis.[41] Four decades earlier, the 1973 oil shock

38 Helm (2010).

39 For example, the UK Confederation of British Industry (CBI) has estimated that green industries provided over a third of UK economic growth in 2011/12. See CBI (2012), 'The Colour of Growth: Maximising the Potential of Green Business', http://www.cbi.org.uk/media/1552876/energy_climatechangerpt_web.pdf.

40 At the 2013 Conservative Party conference, the Chancellor was reported in an interview as saying 'I don't want us to be the only people out there in front of the rest of the world. I certainly think we shouldn't be further ahead of our partners in Europe.' See, for example, http://www.theguardian.com/environment/2013/sep/28/climate-change-energy-bills-george-osborne.

41 Froggatt, A. et al. (2012), *Reset or Restart? The Impact of Fukushima on the Japanese and German Energy Sectors*, Chatham House, http://www.chathamhouse.org/sites/default/files/public/Research/Energy,%20Environment%20and%20Development/bp0712_fukushima.pdf.

led France – largely reliant upon oil-fired power stations – to commence an ambitious programme of nuclear expansion, installing 56 nuclear power stations within 15 years, enough to meet its own power needs and begin exporting electricity to its neighbours. The 1973 oil shock also saw the US government undertake a raft of policy measures to increase energy efficiency and reduce dependency on foreign oil. The quest for energy independence saw successive federal governments support the development of horizontal drilling and hydraulic fracturing (fracking) technologies, an investment now paying off spectacularly with the 'shale gas revolution'.

These examples indicate the potential of immediate, visible threats to national security to create the enabling conditions for reform. Destabilizing shocks can disrupt domestic politics and create the political space for radical policy action. The trouble with climate change is that the threat is distant; by the time it becomes sufficiently visible for publics to demand action, inertia in the climate system means it will be too late to avoid the worst impacts.

Middle-income countries

Most of the world's poor live in MICs.[42] Economic development is invariably the policy priority for governments, whether democratic or autocratic, but typically as a precondition for the delivery of other priorities on which their legitimacy ultimately rests, such as reductions in inequality, the expansion of public services and social protection, and the provision of affordable housing.

Although sharing these priorities, the Chinese government has nevertheless afforded considerable prominence to mitigation policy. This is probably due to a number of factors:

- Unchecked, climate change could lead to politically destabilizing impacts in China, whose position as the world's largest emitter makes it uniquely able to influence global mitigation.
- Low-carbon market opportunities are fundamental to China's industrial strategy, as illustrated by its success with solar PV manufacturing, 95 per cent of which is exported.
- Low-carbon policies are largely compatible with China's broader strategic objectives to improve resource efficiency, reduce air pollution and enhance energy security.

As in HICs, explicit prioritization of mitigation may be politically risky for MIC politicians. Emissions commitments may be unpopular with domestic media and elites that see HIC decarbonization as a *sine qua non* for reciprocal action in the developing world. In India, where over two-thirds of the population fall below the World Bank's poverty threshold of $2 a day, international pressure to act on emissions is often framed as part of a post-colonial agenda to contain India's development.

Low-income countries

Mitigation is understandably furthest down the political agenda in LICs. Public awareness of climate change is likely to be low. Policy-making rightly prioritizes economic development, poverty reduction and expanding access to healthcare and education. High vulnerability to climate change and low emissions mean climate strategies emphasize adaptation rather than mitigation.

A lack of exemplar countries in which development has occurred without significant increases in emissions creates a key hurdle for LIC politicians. A national project of low-carbon development faces a high risk of failure and – without climate finance – would impose significant opportunity costs on public spending for priorities such as health and education. As such, hard economic realities rather than political risk constrain government action.

A few LIC governments are nevertheless embarking on ambitious low-carbon development strategies. The example of Ethiopia was noted earlier; another is Rwanda. Key drivers for these governments include the ambition to gain early advantage in new green sectors, the opportunity to access climate finance, the wish to avoid increasing dependency on oil imports, and the hope of encouraging greater ambition among HIC and MIC countries. In each case, strong, autocratic leaders were instrumental in developing these ambitions.

42 Sumner, A. (2012) 'Where Will the World's Poor Live? An Update on Global Poverty and the New Bottom Billion', Center for Global Development, http://www.cgdev.org/publication/where-will-worlds-poor-live-update-global-poverty-and-new-bottom-billion-working-paper.

Mitigation as complementary policy objective

Across all three country income groups, an important lesson seems to be that climate politics are most straightforward when mitigation objectives are aligned with other priorities. For example, China's plans to reduce the share of coal within the energy mix are justified as part of a clean air agenda; efficiency measures have been easier for the Indian government to pursue than renewable programmes because the former have a direct cost benefit.[43] More broadly, in many MIC, HIC and LIC countries energy security has become an important strategic objective, to which both renewable and energy efficiency policies can contribute. Governments can achieve policy alignment by 'bundling' mitigation with complementary policies to create 'win-wins', or by 'smuggling' mitigation objectives into other policy initiatives.[44]

Summary: the political economy of low-carbon development

The challenges governments face in transforming their economies can be considered in terms of government capacity, economic conditions and political conditions which together imply a political economy of low-carbon development.

The nature of these challenges varies according to level of development. Table 2 summarizes in stylized form for HICs, MICs and LICs. The shading indicates the extent to which the overall conditions might be considered enabling (light blue), disabling (dark blue) or neutral (grey).

Conclusions

The task of decarbonization is essentially one of industrial policy, though it is not confined to the industrial sector. Governments must develop national transformation

Table 2: The political economy of low-carbon development in HICs, MICs and LICs

	High-income countries	Middle-income countries	Low-income countries
Government capacity	• Abundance of human resources • High transparency and good governance • Effective institutions • Environment ministries are weak within government	• Potential to build upon existing process and institutions of industrialization • Moderate transparency and governance • Environment ministries are weak within government	• Lack of human resources • Weak governance and poor transparency • Weak institutions • Weak local governments • Environment ministries are weak within government
Economic conditions	• Post-industrial • Well-developed private sector • Deep and liquid capital markets • Large public resources • Stagnant growth, declining real incomes and deficits	• Industrial • Developing private sector often dominated by parastatals • Moderate public resources and private capital flows • Economic growth • Infrastructure deficits	• Pre-industrial • Undeveloped and fragmented private sector • Low levels of public or private investment • Economic growth
Political conditions	• Focus on jobs, real incomes and deficits • Climate policy offers little political upside and significant downside risk • High public awareness and high ambivalence • High levels of incumbency	• Focus on economic development, inequality and expansion of services • Potential risks from policy emphasis on mitigation • Public resistance to fossil fuel subsidy reform • Increasing awareness of localized pollution • Increasing incumbency	• Focus on poverty reduction, health and education • Low levels of public awareness • Public resistance to fossil fuel subsidy reform • Low levels of incumbency

43 Harrison and Kostka (2012).

44 For example, both the Indian and Chinese governments have successfully bundled mitigation with other policies or aligned it with other objectives to secure support; see Harrison and Kostka (2012). Co-benefits from low carbon policies such as health improvements, access to energy, reduced congestion and reduced pollution have been important drivers for action in other poor countries; see Ellis, K. et al. (2013), 'Drivers and Challenges for Climate Compatible Development', Climate and Development Knowledge Network.

strategies, intervene in markets to create and withdraw rents, and develop effective institutions and processes to support the process of experimentation and discovery while avoiding policy capture.

In poor countries, the principal challenge is lack of government capacity. This implies that building national capacities and supporting nationally owned green industrial policy processes may be a better use of climate finance than the fragmented, project-based approach normally preferred by donors. It also underlines the importance of knowledge platforms and peer-to-peer learning networks as important means to support policy-makers.

In contrast, for rich countries the challenge is primarily political. Success requires governments to pursue policies that are discounted by their populations or even unpopular in the short term, and to confront powerful incumbent interests. This implies political risk, and leaders have to be prepared to accept it and manage it.

The challenges presented by high-carbon incumbents in rich countries hold important lessons for poor countries. Investment decisions made today will shape the political economy of decarbonization tomorrow. While possibly more expedient in the short term, a development pathway that begins on a conventional model and aims to shift to a low-carbon one in the medium term will certainly encounter resistance as high-carbon interests accumulate and mobilize to resist the planned transition. This further underscores the importance of climate finance, not only to help build the government capacity needed to commence on a low-carbon pathway from the outset, but also to help finance the upfront capital costs of low-carbon investments and avoid lock-in.

In all countries, economic growth helps – it creates political space for government action and the economic space to accommodate reallocation of resources – but it should not be viewed as a prerequisite for low-carbon policy implementation. As developed economies recover, political aversion to climate policy will decline, creating the opportunity for renewed commitment in the run-up to the 2015 UN Framework Convention on Climate Change (UNFCCC) conference in Paris. On the other hand, recent slowdowns in a number of major emerging economies could reduce political will among these governments.

Bundling mitigation with existing policy priorities and highlighting the co-benefits – such as energy security, energy efficiency or clean air – provides governments with a way to manage political risk. Ultimately, however, rapid decarbonization requires governments to make mitigation a policy priority. They need to develop long-term policy frameworks, with short- and medium-term objectives, which accommodate mitigation alongside other related policy priorities such as energy security and industrial strategy. These must be resilient – able to adapt and respond to economic circumstances while continuing to balance their policy objectives.

Policy learning and experimentation are crucial. There are no blueprints or 'off the shelf' solutions. There are, however, major uncertainties and contingencies, and powerful opposed interests. Successful approaches are likely to be context-specific and will need to be discovered through adaptive processes. Piloting provides an important way in which governments can work with the private sector on transformation, demonstrate success, overcome opposition and avoid policy deadlock. As such, piloting is more than a technical exercise; it is a political project.

Cooperation is key. New and stronger partnerships between governments, civil society and companies will be critical to success in every area of low-carbon development. In addition to peer-to-peer learning networks, other inter-governmental opportunities include cross-border innovation and technology cooperation, harmonization of low-carbon product standards, and steps to avoid trade disputes over low-carbon goods and services. Piloting also provides opportunities for governments to collaborate on policy learning and experimentation, for example through innovative models to develop low-carbon zones through bilateral or trilateral cooperation initiatives.[45]

45 For example, Chatham House has worked with partners in Europe, China and Ethiopia to foster cooperation between the EU and China on establishing low-carbon zones in China, and between the EU, China and Ethiopia to scope low-carbon zones in Ethiopia.

Finally, despite the multiple challenges discussed in this paper, the political economy of low-carbon development is shifting rapidly. Low-carbon policy-making is becoming globalized – for example, a 2013 World Bank survey identified 26 regional, national and sub-national emissions trading schemes under consideration, scheduled or implemented, with the potential to cover almost half of global emissions.[46] Major opportunities exist in developing countries to leapfrog onto new development pathways, reduce pollution and improve access to clean energy. Meanwhile the costs of low-carbon technologies are falling fast, the share of renewable energy is increasing, and the green economy is expanding. Increasingly, the key challenge for governments – of avoiding high-carbon lock-in – is one of strategic choice rather than affordability.

The 'Scoping trilateral cooperation on Low Carbon Zones in Africa project' is led by Chatham House with project partners E3G, the Horn of Africa Regional Environment Centre/Network (HOAREC) and the Chinese Academy of Social Sciences (CASS).

This document is an output from a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID, DGIS or the entities managing the delivery of the Climate and Development Knowledge Network, which can accept no responsibility or liability for such views, completeness or accuracy of the information or for any reliance placed on them.

Rob Bailey is Acting Research Director and **Felix Preston** is a Senior Research Fellow in the Energy, Environment and Resources Department at Chatham House.

The authors would like to thank Satishkumar Belliethathan, Tracy Carty, Salim Fakir, Antony Froggatt, Zhuang Guiyang, Nick Mabey and Diarmuid Torney for their input and comments.

The authors are also grateful to Bernice Lee, Ivan Mbirimi, Chris Littlecott, Robel Meseret Tadesse, Yu Xiang and Zhao Changhui, and to participants at the Chatham House workshop on the political economy of low-carbon development, held in London in June 2013.

Chatham House
10 St James's Square
London SW1Y 4LE
www.chathamhouse.org
Registered charity no: 208223
Chatham House (the Royal Institute of International Affairs) is an independent body which promotes the rigorous study of international questions and does not express opinions of its own. The opinions expressed in this publication are the responsibility of the authors.

Cover image: © istockphoto.com

Designed and typeset by Soapbox, www.soapbox.co.uk

46 World Bank (2013), 'Mapping Carbon Pricing Initiatives: Developments and Prospects 2013', https://www.thepmr.org/system/files/documents/Mapping%20Carbon%20Pricing%20Initiatives-%20Developments%20and%20Prospects.pdf.