

Pre-publication version of
Jotzo, F. (2012), 'Can Indonesia Lead on Climate
Change?' in Reid, A.S. *Indonesia Rising: The
Repositioning of Asia's Third Giant*, ISEAS, Singapore.

7 CAN INDONESIA LEAD ON CLIMATE CHANGE?

Frank Jotzo

Indonesia's environment matters not only to the quality of life of its people, but also to its neighbours and the world. Indonesia is among the world's largest emitters of carbon dioxide, but it has good opportunities to reduce those emissions to the benefit of future generations everywhere. Better management of the environment could also have more tangible benefits, such as saving Indonesia's neighbours from haze pollution, reducing flooding, increasing agricultural productivity and protecting Indonesia's globally important reservoirs of biological diversity.

There is a fundamental tension between the environment and development in Indonesia (Resosudarmo and Jotzo 2009). The country is exceptionally well endowed with natural resources, the exploitation of which accounts for a large share of economic activity. Conversion of natural forests to oil palm plantations brings jobs and infrastructure to backward areas. It also creates large profits for industry as well as substantial tax revenues. So does mining for minerals and coal, and the extraction of oil and gas. Meanwhile, growth in service and manufacturing industries together with rising household incomes mean ever-increasing demand for electricity and other forms of energy.

Managing the environmental effects of economic development is a challenge for all countries. Sustainability entered mainstream global strategic thinking with the 1992 Rio Earth Summit and today finds its expression in the ambition for 'green growth'. Climate change is the emblematic issue in the quest for green growth, as rapid global economic growth using the conventional, greenhouse gas-intensive model could result in dangerous changes to the world's climate. The issue is not to slow development and economic growth but to achieve such growth in a manner than puts less stress on the environment.

Indonesia could play an important role in the global effort to put economies on a more environmentally sustainable footing. On climate change in particular, Indonesia might be able to take a leadership role among developing countries, because of its potential to change its trajectory in deforestation and energy supply, and because of its strategic position as a large, fast-growing developing country that tends to look for a middle way in international affairs.

Indonesia has been a positive influence in international climate change negotiations, reflecting its desire to be a responsible and constructive player on the global stage. President Susilo Bambang Yudhoyono made a significant pledge to reign in Indonesia's greenhouse gas emissions, choosing a G20 summit as the venue for his announcement.

But pledges do not equal action. In Indonesia as in other democracies, substantive reform tends to meet resistance from entrenched interests. The owners of resources tend to oppose new laws that would force them to operate with more regard to the environment, even if it serves the overall national interest. As Chatib Basri points out in Chapter 3 of this volume, in the context of market reform, powerful vested interests can hold sway over the highest levels of politics. Local communities that rely on forest conversion generally see little benefit in contributing to a national or global ambition to reduce carbon emissions. Line ministries in the resource sectors tend to look after their industrial clients, and are often looked after by those industries in turn.

This chapter is organized as follows. The next section discusses international climate change policy, and Indonesia's role in it. This is followed by an examination of Indonesia's greenhouse gas emissions profile and its emission reduction target. The chapter then looks at ways to meet that target before discussing political and institutional constraints.

INDONESIA'S ROLE IN INTERNATIONAL CLIMATE CHANGE POLICY

Climate change as a global strategic and policy issue

Climate change has been a top-level item on the agendas of international forums and national governments, following a number of influential reports that pointed out its dangers and charted ways of addressing the challenge. Among the most influential were the 2007 report by the Intergovernmental Panel on Climate Change (IPCC 2007) and a review of the economics of climate change commissioned by the British government and led by Lord Nicholas Stern, a prominent economist who had formerly worked for the World Bank (Stern et al. 2006).

The IPCC report summarized the increasingly firm insights from climate change science and helped establish the case for urgent government action to reduce greenhouse gas emissions. These findings were subsequently popularized by former US vice-president Al Gore by way of a documentary movie, *An Inconvenient Truth*, which further elevated the issue in public debate, in Indonesia as elsewhere.

Stern, meanwhile, made a powerful argument that addressing climate change was primarily a matter of good economics. He argued that the cost of cutting emissions now was much lower than the likely adverse economic impacts later on, and presented analysis on how countries could change their greenhouse gas trajectories without sacrificing much economic growth.

This helped elevate the issue in the consideration of many governments, as it was no longer considered 'just' an environmental issue. Climate change was a key subject of discussion among finance ministers of the G20 group of nations, especially during 2008 and 2009. It was the topic of the *Human Development Report 2007/2008* (Watkins 2007) and the *World Development Report 2010* (World Bank 2010), and the subject of comprehensive strategy reviews by national governments (see, for example, Garnaut 2008).

Responding to climate change is increasingly seen not just as an issue that requires cooperative action to limit the risk of future damage, but also as an opportunity for strategic leadership. Attaining leadership in clean energy technologies has been spelled out as a strategic goal by both China and the United States.

Indonesia has no prospect of technological leadership. Moreover, international action to cut greenhouse gas emissions poses a strategic challenge for its exports of fossil fuels, in particular coal, the most carbon-intensive fuel. Indonesia is now the largest exporter globally of coal for electricity production, and the second-largest coal exporter overall (just behind Australia) after annual increases of more than 10 per cent over the last five years (EIA 2012). Demand for such thermal coal is strong in the short term, but depending on the extent of global action to mitigate climate change, it may tail off in the future (IEA 2011). This would have serious implications for Indonesia's export revenues. However, Indonesia has a strong interest in fostering global action in order to minimize adverse impacts from future climate change.

International climate change policy and Indonesia's interests

The scale of effective global action to mitigate climate change would be enormous. The ambition enshrined in the 1992 United Nations Framework Convention on Climate Change, ratified by practically all coun-

tries, is to avoid dangerous climate change. The mainstream scientific view is that this necessitates keeping the rise in global average temperatures to less than 2 degrees above the pre-industrial average (that is, before the time that fossil fuels started to be burned on an industrial scale). It would require a drastic turnaround in global emission trajectories to achieve sizeable annual reductions in the next decade (Steffen 2011) and to reduce the annual level of emissions to perhaps half their current level by 2050.

This is a massive challenge in the face of rapid economic growth in developing countries and the fast expansion of energy use it brings with it (Garnaut et al. 2008). Current policy settings will fail to achieve this goal. However, following the 2009 UN climate conference in Copenhagen, most nations have now made pledges to constrain or cut their emissions (Jotzo 2010; McKibbin, Morris and Wilcoxon 2011). Negotiations to make these pledges binding have been slow, but many countries are preparing or implementing policies to help put their pledges into action – including Indonesia, as examined further below.

Indonesia has a strong self-interest in fostering an effective global response to climate change. The country is highly vulnerable to the effects of climate change: sea-level rise threatens to inundate its coastal cities and agricultural areas; intensification of rainfall patterns may cause more frequent flooding as well as more pronounced periods of low rainfall; and higher temperatures and the spread of mosquito-borne diseases would have adverse effects on human health (Jotzo et al. 2009; Yusuf and Francisco 2009). It is also in Indonesia's interest to develop effective coping (adaptation) mechanisms, and for the international community to assist Indonesia where appropriate, for example through support for research and development, exchange of experiences and funding for infrastructure.

Indonesia has substantial opportunities to cut its emissions and become one of the few developing countries that manages to reduce its absolute level of emissions in the short to medium term. As laid out in more detail below, important savings in emissions could be achieved at little or no economic cost, or could even carry a net benefit quite apart from their effect on greenhouse gas emissions. Better environmental management and improved policy and regulatory settings are the key to such savings. Other options to cut emissions would have economic costs because they would involve more costly production processes or mean foregoing other economic opportunities. In many cases implementation would require compensation to stakeholders or interest groups; in most it would require sound institutional foundations.

International financing

International financing for climate change mitigation may help make many of these emission reduction options economically feasible and politically more attractive. A limited amount of project-based financing already exists under the Kyoto Protocol's Clean Development Mechanism, where carbon credits are created from projects such as retrofitting cement plants, capturing gases from landfills and producing electricity from hydropower, geothermal plants or palm oil residue. The credits are bought by investors in Europe and Japan to help them fulfil their emission reduction obligations under the Kyoto Protocol.

Climate change financing is becoming increasingly available from multilateral agencies. The Clean Technology Fund administered by the World Bank and Asian Development Bank, for example, has provided \$400 million in co-financing for renewable energy and energy efficiency in Indonesia. The fund aims to mobilize an additional \$2.7 billion from other sources (ADB 2010).

Looking ahead, the hope and expectation is that large-scale climate change financing will become available to support reductions in deforestation, improvements in land management and investments in clean energy alternatives. Over time, market-based financing may gain in importance as developed countries make investments in developing countries to help meet their own climate change commitments.

Under the banner of reducing emissions from deforestation and forest degradation (REDD), there have been many years of UN negotiations and preparations by civil society and business groups to establish such financing mechanisms. Alongside Brazil, Indonesia could potentially become the largest supplier of REDD credits.

Norway has promised to provide up to \$1 billion to Indonesia to improve forest management, and as a reward for curbing deforestation (Governments of Norway and Indonesia 2010; Jupesta et al. 2011; Ardiansyah 2012). This is the single largest initiative to date aimed at driving REDD forward in Indonesia. By all indications it has been successful at least in catching the attention of policy makers and instigating some changes to land-use policy, as discussed further below.

Substantial progress has been made on the technical aspects of creating international REDD mechanisms, but the problem now lies in limited demand for such credits from developed countries. At present no developed country has domestic policies in place that would create demand for the credits. This may change, depending in part on whether the implementation of REDD schemes inspires sufficient trust among developed countries that the credits do in fact represent true reductions in emissions.

Indonesia's positioning in the climate negotiations

Indonesia has long played a progressive role in international climate policy. In climate negotiations as in other international forums, it is generally seen as a moderate voice, contributing constructively to technical work, helping to build consensus among developing countries and making efforts to bridge the gap between developing and developed countries. Indonesia was the first OPEC country to ratify the Kyoto Protocol (in 2004)¹ and has made various joint submissions with other countries, for example Australia.

But Indonesia has taken charge of the agenda only on rare occasions. One such occasion was the 2007 UN climate conference in Bali, as highlighted by Garnaut in Chapter 2 of this volume. As host and president of the conference, Indonesia had a significant hand in engineering the official start of a new process for international negotiations. The Bali Roadmap sketched out the agenda towards the infamous 2009 Copenhagen conference where world leaders met to discuss climate change but no real agreement could be struck. The principles agreed in Bali still reverberate in the ongoing climate negotiations.

Another notable instance was President Yudhoyono's announcement in 2009 that Indonesia would adopt a unilateral emissions target of potentially significant stringency (Yudhoyono 2009). The announcement was made at a meeting of G20 leaders in the United States, and it was made earlier than corresponding pledges by many other major developing countries. It was thus calibrated for maximum international visibility (Aspinall 2010).

Despite Indonesia's central position in shaping the Bali Roadmap and its highly visible voluntary national pledge, Indonesia did not end up being one of the main protagonists at the Copenhagen conference. Among the developing countries, this role fell to the so-called BASIC group, the name given to the alliance of Brazil, South Africa, India and China in the climate negotiations. The BASIC group has continued to set the agenda on many aspects of the global climate change regime until the time of writing in early 2012, while Indonesia's role has been much less pronounced. Indonesia would be a logical member of this group given its size and global importance for addressing climate change – it is far larger in population and greenhouse gas emissions than South Africa.

Why did Indonesia not become part of the BASIC group? Does the well-worn cliché of Indonesia 'punching below its weight' apply? Part of the answer may lie in the fact that Indonesia's weight in international climate negotiations is less than its size might suggest. Each of the four

1 Indonesia withdrew from OPEC in 2008 after becoming a net importer of oil.

BASIC member states has much greater institutional capacity on climate change and each has a much longer history of strong engagement in the climate negotiations. In South Africa's case, an additional factor is that the country tends to be seen as a de facto representative of African interests as a whole, with few other African nations having the capacity to represent their interests by themselves. So Indonesia may simply not have been viewed as a rightful member of the club.

On the other hand, in early 2010 there were reports that Indonesia had received informal offers to join BASIC (Simamor and Nurhayati 2010). If this is so, then strategic considerations may have played a role in its decision not to become a member. Indonesia has expressed its desire to make 'a million friends and zero enemies' (see page XX). Joining BASIC would put it in the camp of countries that have pursued a much more hard-line approach to the international negotiations than Indonesia has done. It would run counter to Indonesia's role as a moderate and conciliatory influence, and might be seen to jeopardize its position of soft influence not just in climate change but in other areas of international affairs. Some developed countries might view a decision to join as an affront, even if Indonesia sought to become a moderating force within the group.

A Southeast Asian leadership role?

Indonesia is of course free to take a leadership role on its own, or in conjunction with other countries. A promising bilateral alliance would seem to be with Brazil. Both countries are dominant in their respective regions of the world, and significant in global economic terms. Both are rich in resources and in forested land that is being converted to plantations and agriculture. Together they would account for the vast majority of global opportunities to cut forest-related emissions. If they could agree on a common approach, this would give the bilateral partnership substantial leverage in negotiations with developed countries.

The strongest potential for Indonesian leadership, however, may be in the Southeast Asian region – in line with the government's stated foreign policy objective 'to demonstrate leadership in ASEAN cooperation' (Ministry of Foreign Affairs 2012). Indonesia is the dominant country in Southeast Asia, not just in terms of population but also in terms of greenhouse gas emissions. Its physical, social and economic diversity means that most climate change issues of importance to other Southeast Asian countries are also, in one form or another, domestic issues of importance to Indonesia. Hence, it should have little trouble speaking for the region as a whole.

On the face of it, these factors would suggest a natural leadership role for Indonesia in Southeast Asia on climate change – not necessarily by way of a formal group within the international negotiations, but pos-

sibly by way of an informal role as champion of Southeast Asian interests in the climate negotiations. Against this vision of regional leadership stands the fact that several Southeast Asian countries – especially the Philippines and Thailand – have been playing significant roles of their own in the international climate negotiations. Papua New Guinea has made its mark in negotiations on forestry issues and Singapore is also actively pursuing its own agenda. It therefore appears unlikely in the near term that Indonesia would assume a unilateral leadership position in the UN negotiations. Similarly, there appears to be little prospect in the short term that Southeast Asia would come to a common negotiating position – with Indonesia playing a key role in defining it – in light of the experience within ASEAN (see Chapter 5 by Sukma).

Nevertheless, Indonesia may find itself in a natural leadership role in the region with regard to an Asia–Pacific carbon-trading scheme. Such a scheme might comprise a number of Southeast and East Asian developing countries as sellers of emission reductions, and countries such as Australia, South Korea and Japan, and North American states such as California, as buyers. As the largest potential destination for investment to cut emissions, Indonesia would have a natural role in establishing such a regional trading scheme, and in defining the rules.

Domestic prerequisites

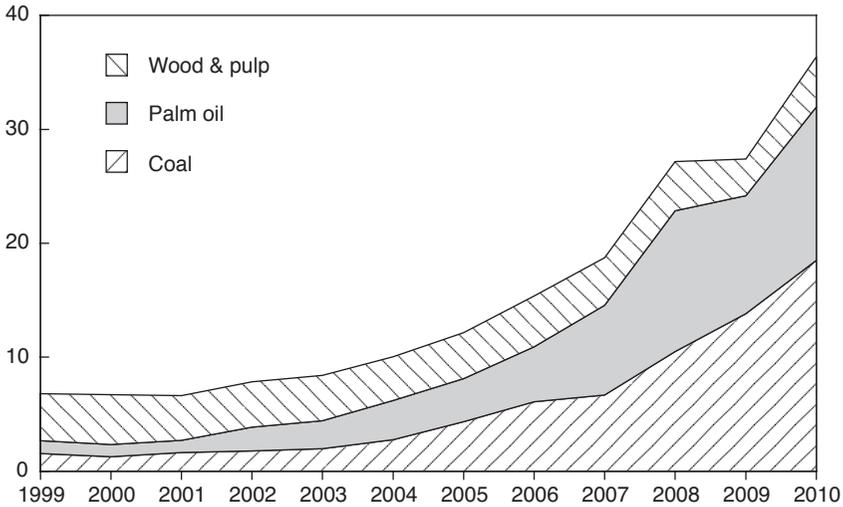
Any international leadership role must be built on the foundation of domestic action on climate change; without effective implementation at home, external leadership ambitions remain hollow. This means creating the necessary institutions, putting in place suitable policy frameworks and ensuring thorough and sustained implementation. It also means encroaching on entrenched economic interests and cutting across established patterns of political power in managing the economy, both at the central and regional government levels. As discussed below, this will require significant effort, including political leadership and well-managed transitional arrangements. Without such domestic policy resolve, Indonesia's international leadership ambitions would likely falter.

INDONESIA'S EMISSIONS PROFILE AND EMISSIONS TARGET

Resources and environment

Agriculture and mining play an important role in the Indonesian economy. Together they account for around a quarter of GDP – slightly more than the entire manufacturing sector – and they make up roughly half the value of the nation's exports (Bank Indonesia 2012).

Figure 7.1 Value of Indonesia's exports of coal, palm oil, and wood and pulp, 1999–2010 (\$ billion, current)



Source: CEIC Asia database.

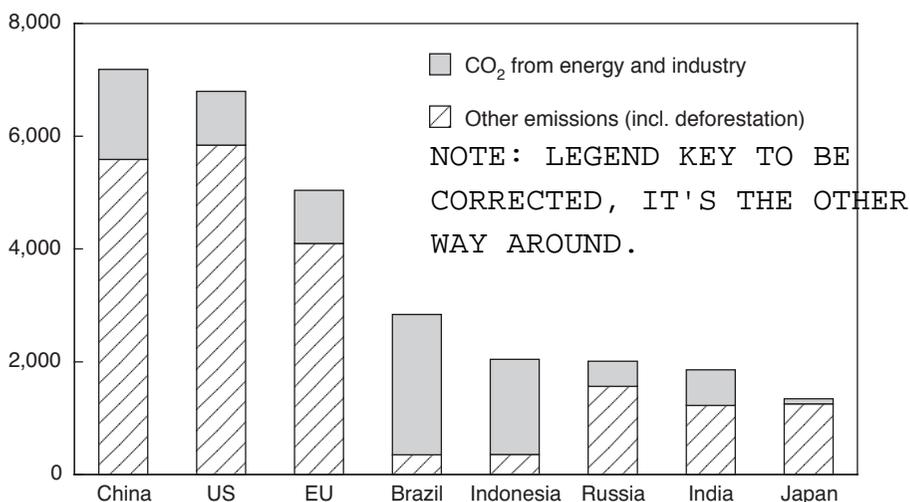
Within mining, fossil fuels (coal, oil and gas) make the dominant contribution to the economy, and to exports. Coal production and exports have increased dramatically in recent years (Figure 7.1) at the same time as oil production has shrunk and Indonesia has become a net importer of oil. Coal has a larger environmental impact than other fuels because it is the most carbon-intensive form of energy. In most cases the mining activities also have greater local impacts than either oil and gas extraction or renewable energies.

Within agriculture, plantations are playing a sharply increasing role in production and exports, with palm oil production a particularly lucrative business due to high global demand and prices. The strong demand for palm oil has been driving large-scale conversion of forests to plantations, which in turn releases large amounts of carbon dioxide.

Indonesia's greenhouse gas emissions in context

Indonesia is one of the world's most populous nations, and also one of the largest emitters of human-induced greenhouse gases. According to the most recent comparable estimates, Indonesia was the world's fifth-largest emitter of greenhouse gases in 2005 (Figure 7.2), or the fourth largest if considering the European Union as individual countries. In an

Figure 7.2 Annual greenhouse gas emissions of the largest emitting countries, 2005 (million tonnes CO₂ equivalent)



Source: World Resources Institute, Climate Analysis Indicators Tool (CAIT), version 8, available at <http://cait.wri.org/>.

earlier, widely reported study (PEACE 2007), Indonesia was described as the world's third-largest emitter. This was because the estimates were for 2000, a year in which Indonesia's land-based emissions were estimated to exceed those of Brazil.

The largest share of Indonesia's greenhouse gas emissions comprises carbon dioxide from the land sector. This is mostly due to deforestation, that is, the conversion of forests to make way for agricultural land or simply the removal of trees without replanting. Indonesia had one of the world's highest rates of deforestation during the 1990s, with forests in Kalimantan and Sumatra disappearing particularly rapidly. The rate has since decelerated, but is still high globally (Table 7.1). It should be noted, though, that deforestation data are notoriously uncertain. Different data sets and estimation methodologies can yield very different estimates.

Peatlands also make a major contribution to Indonesia's land-based carbon dioxide emissions. Peatlands are naturally covered by water but are often drained to make the land available for agriculture. The ground is then susceptible to burning, which can release enormous quantities of carbon dioxide into the atmosphere. This is particularly prone to happen during La Niña years when the rains arrive late. Large and protracted peat fires occurred during 1997–98, when Indonesia may temporarily

Table 7.1 *Deforestation in Indonesia, Malaysia, Brazil and the world, 1990–2010*

	1990–2000	2000–2005	2005–2010
Rate of reduction (% p.a.)			
Indonesia	1.6	0.3	0.7
Malaysia	0.4	0.6	0.4
Brazil	0.5	0.6	0.4
World	0.2	0.1	0.1
Absolute reduction (million hectares p.a.)			
Indonesia	1,914	310	343
Malaysia	79	140	43
Brazil	2,890	3,090	1,097
World	8,323	4,841	2,790

Source: FAO (2010).

NOTE: NUMBERS IN LAST COLUMN TO BE REVISED

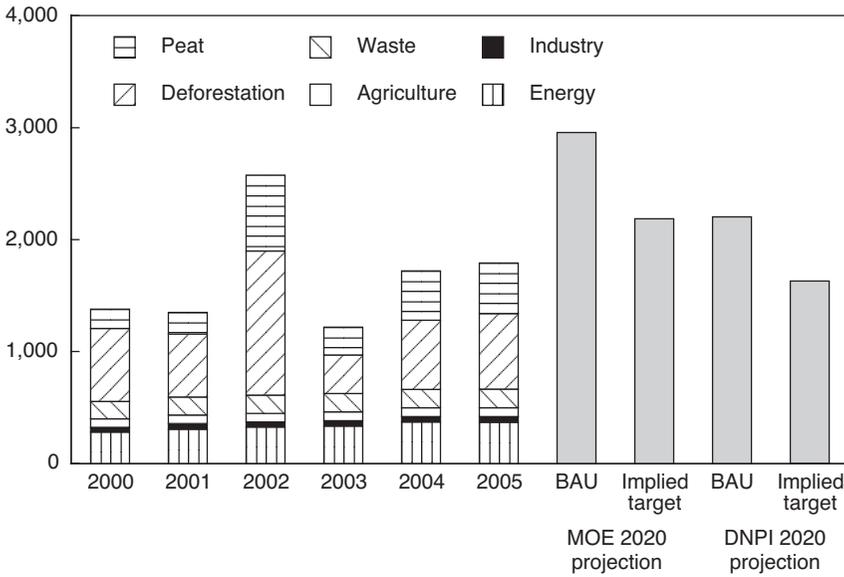
have been the world's largest carbon dioxide emitter (Page et al. 2002), and during several years in the early 2000s.

The combustion of coal, oil and gas is another important part of Indonesia's emissions profile (Figure 7.3). Oil is used predominantly for transport, while coal and gas are used for electricity generation and in industrial applications. Over the period 2000–2005, emissions from energy use accounted for only an estimated one-fifth of Indonesia's total emissions, a much lower share than in most other countries, reflecting the relative importance of land-based emissions. However, this source of emissions has been growing very fast, at around 6 per cent per year. That growth rate implies a doubling of levels every 12 years.

Unless measures are taken to dampen demand and shift to lower-carbon energy sources, fossil fuel use and the resulting carbon dioxide emissions are likely to continue to grow at similar rates in the years and decades to come (Garnaut et al. 2008). That is because, at Indonesia's stage of development, energy use tends to rise at roughly the same rate as overall economic growth. At current prices, the cheapest ways of providing the required energy in most locations is to use coal to produce power, and petrol, diesel or gas for transport. As discussed below, there are alternatives, but these are generally more expensive or face other hurdles.

Other sources of greenhouse gas emissions include methane from agriculture, particularly the cultivation of paddy rice, and waste decom-

Figure 7.3 Indonesia's greenhouse gas emissions by source, 2000–2005, and 2020 target (million tonnes CO₂ equivalent)



Note: BAU = business as usual; MOE = Ministry of Environment; DNPI = Dewan Nasional Perubahan Iklim (National Climate Change Council). Deforestation includes emissions from land use, land-use change and forestry. The 2020 targets are for 26 per cent below business as usual.

Source: Ministry of Environment (2010); DNPI (2011); author's calculations for target levels.

position in landfills. Various industrial processes, such as chemical and cement production, also make a contribution. Emissions from these sources tend to grow more slowly than energy emissions, and in some cases may even decline of their own accord as cleaner technologies and production practices become the norm.

Taken together, these trends imply that Indonesia's emissions profile is likely to change fundamentally over time, with the current dominance of deforestation emissions being replaced by emissions from an ever-growing, fossil fuel-intensive energy sector. Longer-term efforts to reign in emissions growth therefore need to focus not just on forests, but also on energy supply.

Indonesia's 2020 emissions target

In the lead-up to the UN climate conference in Copenhagen at the end of 2009, all major countries made pledges to cut emissions or to reign in

emissions growth. Indonesia's target, like the pledges of several other developing countries, was framed relative to the level of business-as-usual emissions – that is, the level of emissions that would be reached if no effort was made to check them. Indonesia pledged a reduction of 26 per cent below the baseline at 2020, and up to 41 per cent with international assistance (Yudhoyono 2009).

This means that annual emissions would need to be lowered by almost three percentage points each year from what they would otherwise have been. This is a significant effort in absolute terms and broadly comparable to the deviations from business as usual that are explicit or implicit in the pledges of other countries, including the major developed countries, newly industrialized countries such as South Korea and Mexico, and major developing countries such as China, Brazil and South Africa (Jotzo 2010; McKibbin, Morris and Wilcoxon 2011).

To be operational, however, the target needs a baseline, that is, a counterfactual estimate of the emissions trajectory into the future that would prevail without climate policy action (under business as usual). If, for example, the baseline were for emission levels to stay constant over time, then a 26 per cent reduction below the baseline would be a 26 per cent reduction below current emission levels. But if it involved a doubling of emissions, then a 26 per cent reduction from the counterfactual would amount to a 48 per cent increase over current levels.

The baseline is subject to assumptions and judgment. Energy use will keep growing fast, and with it carbon dioxide emissions. Yet the trajectory for emissions from deforestation and the loss of peatlands, which are thought to account for as much as two-thirds of Indonesia's total emissions in an average year, is unclear. Will they stay roughly at the same annual level or will they fall as forest cover declines and fire management practices improve? Or might they even increase as rising resource prices make forest conversion ever more profitable?

Two reports released in 2010 by two different government agencies – the Ministry of Environment and the National Climate Change Council (DNPI) – project business-as-usual emissions growth between 2005 and 2020 to be 65 per cent (Ministry of Environment 2010) and 23 per cent (DNPI 2011). The '26 per cent below business as usual' target then translates either to a roughly one-quarter increase, or a slight decrease, relative to 2005. This is a very large difference in terms of the actual effect on emission levels (Figure 7.3).

The national emissions baseline that will be used to underpin the target therefore defines the ambition of Indonesia's target, and matters greatly for the international credibility of the climate commitment. Hence the issue will need to be revisited by the government. The best way to do this would be to put forward a quantitative baseline for emissions that

is based on sound analysis and open to outside scrutiny. It needs to be well balanced to ensure its assumptions provide international credibility without creating a target that is very costly to achieve. The baseline would then need to be coupled with sound systems to monitor actual emissions.

Alternatively, the emission savings from individual programs and policy interventions could be estimated. However, this would not give a picture of the overall effect of those policies. Also, the process might be open to manipulation: it would be easy to exaggerate the savings from specific interventions; to count measures that would have been implemented anyway for reasons unrelated to climate change; and to leave out of the accounting any policy interventions that increased rather than decreased emissions.

OPTIONS AND MECHANISMS TO CUT EMISSIONS

How and where could the emission reductions be achieved? Most of the near-term potential is in the forestry and land-use sector, where emission levels are high and where successful policy interventions could lead to relatively fast reductions. To enable longer-term cuts, however, Indonesia would need to support reforms in the energy sector. In neither case would implementation be easy, despite the substantial side benefits.

Curbing deforestation and improving land management

Reducing deforestation and improving land management offer the most immediate and promising opportunities for Indonesia to cut its greenhouse gas emissions. When trees are removed and soils disturbed, carbon dioxide is released. Protecting forests, developing plantations on degraded rather than prime forest land, using gentler methods of logging in production forests and planting new forests could all make a big difference to emissions.

The greatest scope for fast improvement, however, is in peatlands. In parts of the islands of Sumatra and Kalimantan in particular, the top layer of soil consists of peat. It releases vast amounts of carbon dioxide when it burns, or when it decomposes after coming into contact with air. Many peat swamps have been drained to allow conversion to agricultural land, and fires occur frequently in these regions, sometimes lasting for months. Stopping the conversion of peat swamps, and reflooding previously drained peatlands, could prevent very large amounts of greenhouse gas emissions.

In Singapore and Malaysia as well as Indonesia, the smoke from forest and peat fires has adversely affected people's health and on occasion disrupted air transport. Better fire management and prevention of peat fires would therefore have benefits not only for global climate change mitigation, but also for Indonesia's neighbours and some parts of Indonesia (Tacconi, Jotzo and Grafton 2008).

Many of the measures outlined above could be implemented at relatively low cost compared with the cost of avoiding greenhouse gas emissions in other sectors of the economy. For example, a study commissioned by the National Climate Change Council has estimated that emissions of up to 500 million tonnes of carbon dioxide per year could be avoided at a cost of under \$1 per tonne through fire prevention and better water management in peatlands alone (DNPI 2011).² This would amount to almost one-sixth of the estimated national total in 2030 under the study's business-as-usual scenario. The per unit cost is many times lower than the prices already being paid by European emitters for emission offsets. According to the estimates, a further 800 million tonnes of carbon dioxide emissions per year could be avoided at low cost through improved forest management and reforestation. In contrast, avoiding deforestation emissions by not allowing conversion of forests to oil palm or pulp wood plantations would carry a much higher cost because of the foregone profit opportunities.

But in practice making these kinds of changes is difficult. In many cases the reforms would threaten the profits of established business interests; in others they would run counter to local economic interests as perceived by local elites or local people. Often, local players simply ignore national laws and regulations – a decree issued in Jakarta may not have much effect at the forest frontier.

To be effective, schemes to cut emissions need to overcome entrenched interests in the bureaucracy where it is an open secret that officials may benefit financially from land conversion activities; to buy out or otherwise bring on board established business interests; and to serve local interests by creating alternative economic opportunities and helping to improve local conditions. This means linking climate change objectives with overall economic reform and good governance, and with broader development objectives. This is a large agenda requiring policy and institutional reform on many levels.

2 Such estimates are subject to great uncertainty; they make assumptions about future economic developments and about the feasibility and cost of measures that are mostly untried on a large scale, and they ignore administrative costs (Schwarz 2010).

Changes to the regulatory framework governing land-use change are one important avenue available to the Indonesian government. It has already embarked on this road by placing a moratorium on new licences for forest conversion, motivated by the agreement with Norway discussed above. The moratorium is time limited, does not affect licences that have already been issued (including a large swathe granted just before it came into force) and excludes land that has been selectively logged (Edwards and Laurance 2011). Nevertheless it is sending a strong signal that the government intends to tackle the issue. This may well influence business investment decisions beyond the immediate effects of withholding some land conversion licences.

Changes to fiscal policy settings are another crucial set of policy options. Business taxes and subsidy schemes for the forestry, plantation and agricultural sectors could be reformed to discourage carbon-intensive operations, and to provide positive incentives for activities that create economic output with a lower environmental footprint.

Fiscal transfers from the central to local levels of government provide another tool to create incentives for the latter to act in accordance with national goals. The central government routinely makes large budgetary payments to the district governments, where many of the practical decisions about land-use change are made. Some of these fiscal transfers could be allocated to support climate-related activities. Ultimately the central government could create a system of financial incentives to implement climate-friendly measures, leaving flexibility to local entities about what actions to take and how to implement them (Ministry of Finance 2009: Ch. 5; Jotzo and Mazouz 2010).

A National Action Plan for the Reduction of Greenhouse Gas Emissions – Rencana Nasional Penurunan Emisi Gas Rumah Kaca – was enacted by presidential decree in September 2011 (Wang-Helmreich et al. 2011). It consists of a catalogue of measures to be taken in different sectors and regions, with various ministries responsible for implementation. The plan quantifies expected reductions in emissions, the vast majority of which would be achieved through better forestry and peatland management. To what extent the broad plan is underpinned by detailed analysis and provision for implementation is unclear.

Reforming the energy sector

Emissions from the energy sector – principally the use of coal, oil and gas for transport, electricity generation, industrial purposes and household use – currently account for around one-quarter of Indonesia's emissions. Energy use in Indonesia is still far below the per capita global average, and even further below per capita energy consumption levels in

developed countries. But it is catching up fast. Aggregate energy use is growing roughly in line with GDP, and a growing share of energy is supplied by high-carbon coal, especially through the expansion of coal-fired power plants (Narjoko and Jotzo 2007). If left unchecked, Indonesia's emissions profile could be dominated by emissions from fossil fuel use within a few decades.

The options to curb emissions growth include improving energy efficiency and so using less energy to supply the same services, and taking the carbon out of the energy supply by shifting to lower-carbon energy sources. Indonesia has plentiful opportunities to do both. To achieve these outcomes, however, it would need to make significant changes to the institutional, regulatory and fiscal settings for the energy sector. Many of these reforms would be politically difficult or face significant practical hurdles in implementation.

A prime example is the expansion of geothermal power, that is, electricity generated using underground volcanic heat. This is a well-established technology, and some geothermal fields can produce electricity at lower cost than coal, especially when the explicit and implicit subsidies for coal-fired generation, and the costs imposed by local pollution, are taken into account (Ministry of Finance 2009: Ch. 4). Indonesia has 40 per cent of the world's geothermal resources, but only around 3 per cent of the resource is developed. A number of geothermal power plants came on line in the 1990s before progress was halted by the 1997–98 financial crisis. The government has an ambitious plan to ramp up geothermal power production, but to date the rate of development of new capacity is slower than would be needed to attain its target.

Geothermal development is hampered by a number of specific factors. They include cumbersome regulatory arrangements that compromise incentives for businesses to invest as independent power producers and to enter into contracts with the state electricity company, PLN. High up-front investment costs coupled with an inflexible system for determining the rates that PLN will pay independent power producers also increase the risk to project developers (Jotzo and Mazouz 2010). More fundamentally, retail electricity pricing does not adequately reflect the cost of producing power. Moreover, as a state monopolist subsidized from the budget, PLN does not face the right incentives to pursue efficient investments and minimize costs. Addressing the underlying distortions in the electricity sector would yield broader economic benefits beyond carbon emission reductions, by enhancing the efficiency of the sector.

Ultimately, the best way for Indonesia to shift investment onto a lower-carbon pathway is to put a tax on emissions. This is widely regarded as the most efficient way of creating economy-wide incentives to cut carbon emissions (Stern et al. 2006). Making high-emission activities relatively

more expensive creates the incentives for lower-emission investments. In addition, a carbon tax could be a source of substantial fiscal revenues that could be used to compensate poor people for the added impost in terms of higher energy costs, and to offset other, more distorting, taxes. Modelling exercises suggest that, in Indonesia's case, a carbon tax could increase economic output as measured by GDP and at the same time reduce poverty (Yusuf and Resosudarmo 2007; Ministry of Finance 2009).

A carbon tax is thus a highly attractive option from the viewpoint of economic policy reform. However, as the experience in other countries has shown, it is also highly politically contentious because it may mean substantial changes to the patterns of profitability in the energy industry as well as higher household prices for energy. Energy pricing reform is a prerequisite for a carbon tax to work as intended; otherwise the price signal cannot work its way through the economy (Howes and Dobes 2010).

It could also be argued that Indonesia should first wind back its subsidies for transport fuels and domestic electricity, which would result in large fiscal savings and provide incentives to cut back on wasteful energy use. These subsidies overwhelmingly benefit middle and higher-income Indonesians, so removing them would not disproportionately penalize the poor, and could actually benefit them if the removal were coupled with income support measures such as the cash transfer program that accompanied the fuel subsidy reductions of 2005 (Beaton and Lontoh 2010). But removing energy subsidies is politically difficult because of its highly visible effect on prices, so phasing in carbon pricing in parallel with energy subsidy removal may be warranted.

POLITICAL ECONOMY OF CLIMATE POLICY REFORM

Reorienting the economy towards more environmentally friendly ways of operating is likely to be a long and windy road of policy reform, driven by the opportunity for economic as well as environmental outcomes, but with political roadblocks all along the way. The experience in most democracies is that entrenched economic and political interests make reform difficult. The difficulties are exacerbated by the fact that the ultimate benefit from climate change policy is a global and long-term one, intangible to local actors and subject to the actions of other countries. Nevertheless, Indonesia has a strong intrinsic interest in limiting climate change and its adverse effects on development, and this could provide an ongoing impetus for reform.

Climate policy reform takes place in a complex system of interwoven interests in society, as sketched below.

Economy and business

The political economy of reform that affects business interests is often characterized by a situation where the likely 'losers' from the reform are highly visible and concentrated, and may have strong political influence based on their existing positions of financial strength or political importance. Potential 'winners', meanwhile, tend to be businesses that are not yet large and well connected. In many cases, winners represent a broad or diffuse set of businesses and individuals ahead of the reform taking place, and sometimes it is not even possible to clearly identify who the winners will be. As a result, the political pressure from business in favour of the status quo tends to be much stronger than the pressure for reform.

This situation is not unique to Indonesia, but also prevails in most other democracies. In the case of climate change policy, the political trade-offs with established industry interests have been evident in both Australia and the European Union, where large amounts of the fiscal revenue from putting a price on emissions have been offered to industry, in large part to buy off opposition from business (Pezzey, Mazouz and Jotzo 2010).

The primacy of self-interest is clearly at work in Indonesia as well (McCarthy and Tacconi 2011). In the land-use sector, existing business practices are geared towards maximizing profits using a business model that takes little or no heed of environmental objectives. A typical model is to convert timber-rich lands to plantations, sell the timber and use the proceeds to finance the establishment of oil palm plantations that are geared for quick returns rather than maximum yield per hectare. An alternative, more environmentally friendly, model would minimize land use by maximizing yield, and seek to establish plantations on degraded land rather than by cutting down natural forests. This model would probably require payments or tax concessions to make it financially attractive, or regulatory interventions to prohibit the conventional way of doing things, coupled with reliable enforcement provisions.

Such a model would clash with the established business models of industry players, who could be expected to resist measures to shift to the alternative path. A typical symptom of this process is that businesses will complain to government about problems with the new model, but will not be prepared to enter into discussions about how their specific concerns might be addressed.

For example, the energy sector is characterized by large investments in long-lived capital and infrastructure, such as power stations, railways and ports, and mines. Changes in policy could reduce the value of those investments, and would therefore meet resistance from large, established business interests. A case in point is Indonesia's coal-fired electricity sector. Large operations have been developed to mine and transport coal

that is not of sufficient quality for export markets, and so is used solely to supply domestic power. A significant portion of these mines, as well as a number of coal-fired power stations, is owned by Bumi Resources, Indonesia's largest coal-producing company. Bumi Resources is majority owned by Aburizal Bakrie and his brother. Bakrie was Coordinating Minister for the Economy and then Minister for People's Welfare in the first Yudhoyono administration, and is now the chairman of the Golkar party. He is widely considered one of Indonesia's most politically influential figures.

Governments and bureaucracy

Entrenched interests can also be found in the Indonesian public service. Line ministries, such as the Ministry of Forestry or the Ministry of Energy, tend to represent the interests of their existing business clientele. This occurs in other countries as well, but the potential for adverse effects on policy making from a national interest perspective are more pronounced where governance is weak and corruption in its many forms is more prevalent.

In contrast, central agencies and ministries with an over-riding brief tend to champion reform. One example is the Presidential Unit for Development Supervision and Control (UKP-PPP), headed by Kuntoro Mangkusubroto who previously oversaw the post-tsunami reconstruction in Aceh. The unit has a REDD implementation task force. Another example is the Ministry of Finance, which has an interest in overall sound management of government finances and strong influence over budget allocations. As pointed out by former finance minister Sri Mulyani, its fiscal policies offer a range of options to support climate change policy objectives (Indrawati 2009), although the shaping of sector-specific policies is not within its remit. There have been tensions between government agencies, for example between the Ministry of Forestry and the UKP-PPP over the moratorium on land conversion, and between the ministries of forestry and finance over a decree on revenues from REDD projects.

The over-riding factor influencing policy decisions in democracies is usually the effect on the popularity of the sitting government and its prospects for re-election. This often precludes difficult policy reform unless there is an externally imposed imperative for it, and tends to make reform harder towards the end of the electoral cycle. As Basri points out in Chapter 3, the Indonesian government is currently hesitant to make further reductions in fuel subsidies, possibly in anticipation of the next presidential election in 2014.

Similar dynamics are at play at the local government level, with the added complication that the incentives for local leaders obviously lie

in serving their local constituencies. In the case of climate change, local objectives do not automatically align with national objectives. For example, the national government has an interest in fulfilling its international climate change commitments in order to increase Indonesia's standing and influence in the global community. But achieving this aim relies in part on the actions of local governments, which have no direct interest in the outcome. Hence, the central government needs to create incentive structures or effective regulatory instruments to bring local and national objectives into line.

Civil society

Non-government organizations have traditionally played an important role in promoting the case for environmental policies in Indonesia. Activism on environmental issues started under Suharto, and today is among the most powerful agents for domestic change on environmental issues. Climate change has also been covered extensively in Indonesia's media. Coverage of specific environmental issues can act as a counterweight to the influence of business interests.

NGOs are an important source of human capital. A number of today's senior government officials and advisers on climate change cut their teeth working for NGOs, and representatives of environmental organizations have frequently been included as official members of Indonesia's delegations to UN climate negotiations.

CONCLUSION

How Indonesia deals with the climate change challenge is important for the world. As one of the most populous countries with a fast-growing and resource-intensive economy, Indonesia contributes a sizeable share of the world's annual greenhouse gas emissions. It also has ample opportunities to cut its emissions – in the forestry and land-use sector in the short term and in the energy sector over the long term. Addressing climate change is part of a broader paradigm where economic growth is less dependent on the exploitation of non-renewable resources and causes fewer adverse environmental impacts. The 'green growth' agenda may become relevant to developing countries that are gaining the economic, social and institutional prerequisites to improve not just the quantity, but also the quality, of their economic growth. Indonesia is one such country.

With its global ramifications and the need for action by most if not all countries, climate change is an important field of international diplomacy. Indonesia's traditional role has been as a moderating force in the

developing world, speaking with a quiet voice and rarely occupying centre stage – except for one or two forays by President Yudhoyono in recent years. As in other areas of international life, Indonesia can be said to have been looking for ‘a million friends and zero enemies’.

Given its size and its centrality on the climate change issue, Indonesia could over time grow into a leadership role as a second-tier global power. Taking more of a leadership role within the Southeast Asian region would also be logical. International leadership starts with action at home, however. To take a greater role in international affairs will require boosting the country’s capacity to monitor and analyse the issues in play, and continued visible political commitment. Above everything else, it will require successful implementation of measures to cut emissions in Indonesia, on a large enough scale to be appreciated internationally.

This will not be an easy task. A thicket of entrenched interests in business and the bureaucracy acts as a brake on reform, with the interplay between central and local government interests creating additional complexity. Electoral politics in many instances precludes reforms that would be beneficial not just to the environment but also to the economy. But Indonesia has shown on more than one occasion that it can manage difficult reforms, and the environment could join the list of successes. If so, it will provide an unusually good opportunity for the country to play an international leadership role.

REFERENCES

- ADB (Australian Development Bank) (2010) *Clean Technology Fund Investment Plan for Indonesia*, ADB, Manila.
- Ardiansyah, F. (2012) ‘Revisiting the global role of tropical forest nations’, *Strategic Review* 2(1): 56–67.
- Aspinall, E. (2010) ‘Indonesia in 2009: democratic triumphs and trials’, in D. Singh (ed.) *Southeast Asian Affairs*, Institute of Southeast Asian Studies, Singapore.
- Bank Indonesia (2012) *Economic and Financial Data for Indonesia*, Bank Indonesia, Jakarta.
- Beaton, C. and L. Lontoh (2010) *Lessons Learned from Indonesia’s Attempts to Reform Fossil-Fuel Subsidies*, International Institute for Sustainable Development, Winnipeg.
- DNPI (Dewan Nasional Perubahan Iklim) (2011) *Indonesia’s Greenhouse Gas Abatement Cost Curve*, DNPI, Jakarta.
- Edwards, D.P. and W.F. Laurance (2011) ‘Carbon emissions: loophole in forest plan for Indonesia’, *Nature* 477: 33.
- EIA (Energy Information Administration) (2012) *International Energy Statistics*, EIA, Washington DC.
- FAO (Food and Agriculture Organization) (2010) ‘Global forest resource assessment 2010’, FAO Forestry Paper No. 163, FAO, Rome.
- Garnaut, R. (2008) *The Garnaut Climate Change Review: Final Report*, Cambridge University Press, Cambridge and New York.

- Garnaut, R., S. Howes, F. Jotzo and P. Sheehan (2008) 'Emissions in the Platinum Age: the implications of rapid development for climate-change mitigation', *Oxford Review of Economic Policy* 24(2): 377–401.
- Governments of Norway and Indonesia (2010) 'Letter of intent between the Government of the Kingdom of Norway and the Government of the Republic of Indonesia on "Cooperation on reducing greenhouse gas emissions from deforestation and forest degradation"', Oslo.
- Howes, S. and L. Dobes (2010) *Climate Change and Fiscal Policy: A Report for APEC*, World Bank, Washington DC.
- IEA (International Energy Agency) (2011) *World Energy Outlook 2011*, IEA, Paris.
- Indrawati, S.M. (2009) 'Policy instruments to influence climate change mitigation and adaptation policies', in *Turning Words into Action: Advancing Reform and the Economic Agenda*, Fiscal Policy Office, Ministry of Finance, Jakarta.
- IPCC (Intergovernmental Panel on Climate Change) (2007) *Climate Change 2007: The Physical Science Basis*, Cambridge University Press, Cambridge.
- Jotzo, F., (2010) 'Comparing the Copenhagen emissions targets', research report, Centre for Climate Economics and Policy, Australian National University, Canberra, available at <http://ideas.repec.org/p/ags/eerhr/107577.html>.
- Jotzo, F. and S. Mazouz (2010) 'Indonesia's climate change challenge: economic policy for effective and efficient mitigation', *Indonesian Quarterly* 38(1): 23–40.
- Jotzo, F., I.A.P. Resosudarmo, D.A. Nurdianto and A.P. Sari (2009) 'Climate change and development in eastern Indonesia', in B. Resosudarmo and F. Jotzo (eds) *Working with Nature against Poverty*, Institute of Southeast Asian Studies, Singapore.
- Jupesta, J. et al. (2011) 'Managing the transition to sustainability in an emerging economy: evaluating green growth policies in Indonesia', *Environmental Innovation and Societal Transitions* 1(2): 187–91.
- McCarthy, S. and L. Tacconi (2011) 'The political economy of tropical deforestation: assessing models and motives', *Environmental Politics* 20(1): 115–32.
- McKibbin, W.J., A.C. Morris and P.J. Wilcoxon (2011) 'Comparing climate commitments: a model-based analysis of the Copenhagen Accord', *Climate Change Economics* 2(2): 79–103.
- Ministry of Environment (2010) *Indonesia Second National Communication under the UN Framework Convention on Climate Change*, Ministry of Environment, Jakarta.
- Ministry of Finance (2009) *Green Paper: Economic and Fiscal Policy Strategies for Climate Change Mitigation in Indonesia*, Ministry of Finance, Jakarta.
- Ministry of Foreign Affairs (2012) *Direction of Indonesian Foreign Policy*, Ministry of Foreign Affairs, Jakarta.
- Narjoko, D.A. and F. Jotzo (2007) 'Survey of recent developments', *Bulletin of Indonesian Economic Studies* 43(2): 143–70.
- Page, S.E., F. Siegert, J.O. Rieley, H.V. Boehm, A. Jaya and S. Limin (2002) 'The amount of carbon released from peat and forest fires in Indonesia during 1997', *Nature* 420: 61–5.
- PEACE (PT Pelangi Energi Abadi Citra Enviro) (2007) *Indonesia and Climate Change*, PEACE, Jakarta.
- Pezzey, J.C.V., S. Mazouz and F. Jotzo (2010) 'The logic of collective action and Australia's climate policy', *Australian Journal of Agricultural and Resource Economics* 54(2): 185–202.
- Resosudarmo, B.P. and F. Jotzo (2009) 'Development, resources and environment in eastern Indonesia', in B.P. Resosudarmo and F. Jotzo (eds) *Working with Nature against Poverty*, Institute of Southeast Asian Studies, Singapore.

- Schwarz, A. (2010) 'Low carbon growth in Indonesia', *Bulletin of Indonesian Economic Studies* 46(2): 181-5.
- Simamor, A.P. and D. Nurhayati (2010) 'Indonesia may join Basic group on climate talks', *Jakarta Post*, 2 March.
- Steffen, W. (2011) *The Critical Decade: Climate Science, Risks and Responses*, Climate Commission, Canberra.
- Stern, N.H. et al. (2006) *Stern Review: The Economics of Climate Change*, HM Treasury, London.
- Tacconi, L., F. Jotzo and R.Q. Grafton (2008) 'Local causes, regional co-operation and global financing for environmental problems: the case of Southeast Asian haze pollution', *International Environmental Agreements: Politics, Law and Economics* 8(1): 1-16.
- Wang-Helmreich, H., W. Sterk, T. Wehnert and C. Arens (2011) 'Current developments in pilot nationally appropriate mitigation actions of developing countries (NAMAs)', JIKO Policy Paper 01/2011, Wuppertal Institute, Wuppertal.
- Watkins, K. (2007) *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World*, Palgrave Macmillan, Houndmills, and New York NY.
- World Bank (2010) *World Development Report 2010: Development and Climate Change*, World Bank, Washington DC.
- Yudhoyono, S.B. (2009) 'Intervention by HE Dr Susilo Bambang Yudhoyono on climate change at the G-20 Leaders' Summit, Pittsburgh PA, available at <http://forestclimatecenter.org/>.
- Yusuf, A.A. and H. Francisco (2009) 'Climate change vulnerability mapping for Southeast Asia', Economy and Environment Program for Southeast Asia, Singapore, available at http://web.idrc.ca/uploads/user-S/12324196651Mapping_Report.pdf.