Ministry of Finance Green Paper

Economic and fiscal policy strategies for climate change mitigation in Indonesia

Ministry of Finance, Republic of Indonesia

Australia Indonesia Partnership

Executive Summary

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FOREWORD BY THE MINISTER OF FINANCE

The world has moved beyond the conventional view that economic growth objectives are incompatible with environmental objectives. We know that left unaddressed, climate change represents a serious threat to our economic wellbeing. On the other hand, sound economic principles are also key to mitigating the impacts of climate change. Central to such principles is the appropriate pricing of carbon and ensuring that climate change mitigation policies across the board are both effective and economically efficient. This emphasizes the need for the Ministry of Finance to play a central role in shaping Indonesia's response to the climate change challenge

Indonesia is looking for solutions to curb greenhouse gas emissions, both through our own domestic measures and working with the international community. To achieve this, we need to better understand the interaction of climate change policies with our development objectives and the broader economic reform agenda, to put sound policies in place, and to get the financing aspects right.

Internationally, Indonesia is known as an advocate of pragmatic and effective climate policy, and this commitment is exemplified by the recent announcement by President Yudhoyono that Indonesia will seek to reduce its greenhouse gas emissions by 26 per cent by 2020 and up to 41 percent with international assistance. Indonesia has also played a strong and active role in the international climate negotiations leading up to the COP15 conference in Copenhagen. Indonesia hosted the 2007 climate conference which developed the Bali Roadmap for a new global climate agreement, and initiated the first international meeting of finance ministers on climate change.

The Green Paper spells out a longer-term strategic framework, grounded in economic principle and international experience, that can guide climate policymaking. Consistent with this framework, the Green Paper sets out selected concrete strategies for fiscal and economic policies for climate change mitigation. It focuses on the energy sector, setting out a policy package for geothermal power; and on the land-use change and forestry sector, spelling out how regional climate change action can be incentivized through Indonesia's fiscal transfer mechanism.

I consider that the Green Paper will be an important part of Indonesia's climate policy debate, and that it will prove a solid basis for the Ministry of Finance to move toward design and implementation of climate change mitigation policies.

Dr Sri Mulyani Indrawati
Minister of Finance
30 November 2009

FOREWORD BY THE HEAD OF THE FISCAL POLICY OFFICE

Indonesia's commitment to reduce greenhouse gas emissions by between 26% and 41% by 2020, compared to a business-as-usual trajectory, poses important questions for fiscal and broader economic policies. It is crucially important to understand the interaction of climate change policies with the development objectives and the broader economic reform agenda, in order to put sound policies in place, and to get the financing aspects right. We want climate change mitigation policies to be both effective and efficient.

This emphasizes the need for the Ministry of Finance to play a central role in shaping Indonesia's response to the climate change challenge through domestic policies, and in bringing Indonesia's influence to bear in international climate finance. As the Ministry of Finance's policy function rests with the Fiscal Policy Office the Green Paper was developed by the Fiscal Policy Office in close collaboration with Australian experts.

This Green Paper takes the Ministry of Finance's engagement with climate policy to a new level. It provides a sound framework for Indonesia's climate policy design, and it spells out a number of concrete strategies for domestic fiscal and economic policies for climate change mitigation, and sets out international financing strategy considerations advantageous to Indonesia.

I consider the Green Paper required reading for anyone involved or interested in Indonesian climate change policy, and for staff in many areas of the Ministry of Finance. I expect it will be an important part of Indonesia's climate policy debate, and that it will prove a solid basis for moving toward detailed design and implementation climate change policies.

Dr Anggito Abimanyu

Head, Fiscal Policy Office, Ministry of Finance

30 November 2009

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This Green Paper is a joint Indonesian and Australian effort.The Green Paper was prepared by Dr Frank Jotzo and Mr Salim Mazouz, in close collaboration with the Fiscal Policy Office of the Ministry of Finance. The team was guided by Professor Armida Alisjahbana (prior to her taking up the post of Minister for Development Planning). Overall project guidance was provided by the Australian Treasury's Government Partnership Fund program through Mr Nathan Dal Bon. The project was funded and managed by the AusAID Technical Assistance Management Facility through Mr Bernie Carmody. Assistance was provided by a number of experts and analysts, including Dr James Gifford, Dr Arief Yusuf, Dr Budy P. Resosudarmo, Dr Ida A.P. Resosudarmo, Dr Axel Michaelowa, Mr Kurnya Roesad and others.

The preparation of the study has been helped enormously by the active support and guidance at key stages by the Minister of Finance, Dr Sri Mulyani. Valuable ongoing input and guidance was provided by Dr Anggito Abimanyu, Head of the Fiscal Policy Office, his senior colleagues Bapak Askolani, Director of Budget Policy and Professor Singgih Riphat, as well as FPO staff members including Pak Amnu Fuadym, Pak Kindy Syahrir and others.

Other stakeholders that provided valuable contributions include: other Directorates of the Ministry of Finance; Bappenas; the Ministries of Environment, Forestry, Energy and Mineral Resources; the National Council on Climate Change and various state-owned and private sector companies, business associations and civil society organizations.

EXECUTIVE SUMMARY

INDONESIA'S ROLE IN GLOBAL CLIMATE CHANGE MITIGATION

Climate change is an issue of high priority for Indonesia. It is highly vulnerable to climate change (ADB 2009), and is a significant emitter of greenhouse gases. Therefore Indonesia has a strong stake in the global effort to limit future climate change.

Indonesia is playing an active and constructive role in the international negotiations and has committed to making a strong contribution to global climate change mitigation.

Indonesia is committed to making a significant contribution to limiting global greenhouse gas emissions, and to helping make a global climate change agreement possible. President Yudhoyono has announced a target for Indonesia to reduce emissions by 26% by 2020 compared to business as usual (see Box 1), and by up to 41% with international support.

Indonesia has played an active and constructive role in the international climate negotiations leading up to the Copenhagen COP15 conference. For example, Indonesia hosted the 2007 COP13 UN climate conference, which developed the Bali Roadmap for a new global climate agreement. Indonesia initiated the first international meeting of finance ministers on climate change, in conjunction with the Bali conference. In addition, Indonesia's Ministry of Finance has been engaged with the climate change discussions in a wide range of international forums, including the G20 and many others.

Indonesia's response to global climate change must be consistent with its development and poverty reduction objectives. Environmental policies need to be in line with economic goals. As President Yudhoyono stated at the G20 Leaders' Summit in Pittsburgh, "We must tell the world it *is* possible to cure the global economy and save the planet at the same time."

Meeting these commitments needs to be consistent with development and poverty reduction objectives, and needs sound economic policy.

THE GREEN PAPER: TOWARDS ECONOMICALLY SOUND CLIMATE POLICY

The Green Paper identifies economic and fiscal policy strategies for climate change mitigation – that is, reducing emissions of carbon dioxide and other greenhouse gases – and how to do this in the most cost effective way. It lays out strategies for the Ministry of Finance for efficient and effective policies, both in the short term and the long term. The paper is grounded in economic principles, and applies emerging international experience to Indonesia's circumstances.

Indonesia is no different to other countries in that a carbon-constrained future presents both significant challenges and opportunities. If Indonesia can put in place policies that enable it to grow its economy along a path of low emissions, it will have played an important part in the solution to the threat of global climate change. At the same time, by moving early to restructure its economy around low emissions, it will gain a competitive advantage relative to other nations in the region, and could stand to benefit economically and financially.

The Green Paper details policy approaches for cost-effective reductions in greenhouse gas emissions.

The Green Paper presents strategies that can guide longer-term policy reform for climate change mitigation, including a move toward pricing of carbon emissions. It sets out concrete options for geothermal policy, and for creating abatement incentives for regional governments, especially to reduce emissions from land-use change and forestry. In these areas it illustrates how economic principles can be used to devise efficient and effective climate policies in the short term. These

Principles for climate policy need to be reflected in implementable policies, and as steps towards a longer term efficient climate policy framework.

principles can be extended to other aspects of energy and land-use change/forestry, and to other parts of the economy such as agriculture and mining.

The Green Paper also sets out strategies to access international financing and canvasses the need for further institutional development. In brief, the strategies proposed are as follows.

THE STRATEGIES IN BRIEF

Strategy for the energy sector:

- Work towards the implementation of a carbon tax/levy on fossil fuel combustion, in parallel with removal over time of energy subsidies. Couple this policy with access to international carbon markets, by negotiating a "no-lose" target with appropriate parameters.
- Introduce complementary measures to incentivize energy efficiency and deployment of low-emissions technology, exemplified by a specific geothermal policy strategy.

Positioning Indonesia for a carbon-constrained future means early restructuring towards a low-emissions economic structure.

Strategy for the land-use change and forestry sector:

- Support and incentivize carbon abatement measures by regional governments through the intergovernmental fiscal transfer system, working toward the creation of a Regional Incentive Mechanism (RIM) for climate change.
- Work with the appropriate ministries to bring existing fiscal policy settings into line with carbon reduction objectives.

Strategy for international carbon finance:

- Support the creation of new, broad-based carbon market mechanisms like sectoral targets and crediting. Support new and additional sources of international public financing. Ensure adequate returns for Indonesia's emissions reductions.

Strategy for institutional development:

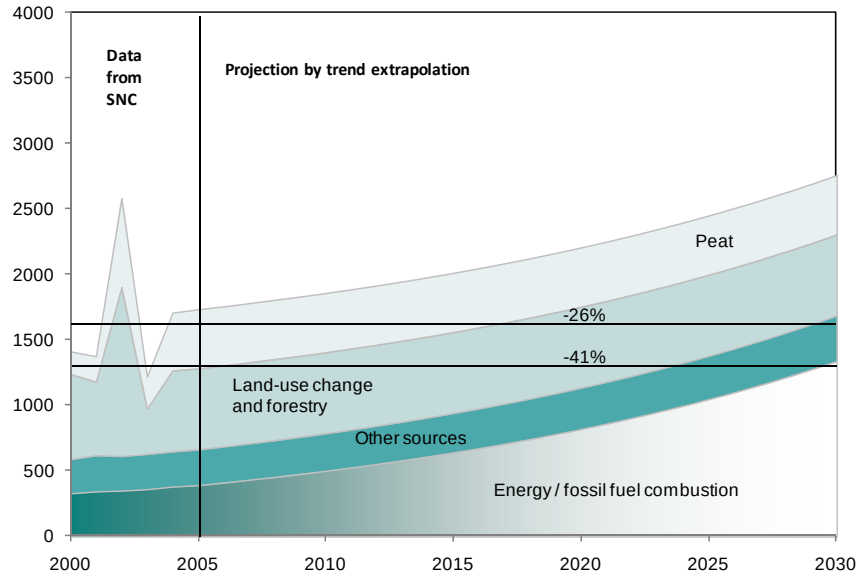
- Strengthen capacity for climate policy analysis at the Ministry of Finance. Support policy coordination across government especially among the economics ministries; and advocate a review of the broader regulatory framework that relates to climate change policy.

EMISSIONS AND REDUCTION GOALS

Emissions from land-use change, forestry and peat dominate Indonesia's emissions profile now, but energy could overtake within a few decades.

Indonesia's current greenhouse emissions profile is dominated by land-use change, forest degradation and peat fires. However, emissions from the energy sector are growing strongly as Indonesia's economy grows. If left unchecked, emissions from this sector could overtake emissions from land-use change and forestry in a few decades.

Figure 1 A business-as-usual scenario for Indonesia's greenhouse gas emissions, based on current trends, $MtCO_2$-e/year



Data sources and notes: see Figure 1.2 in Chapter 1.

Land-based emissions provide the bulk of cost effective short to medium term emissions reductions opportunities. But to get the energy-sector onto a longer-term lower carbon trajectory, policy directions for low-carbon energy need to be set now. An integrated policy effort across all sectors is needed for efficient outcomes, rather than planning for specific quantitative reductions in each sector.

An integrated policy effort across all sectors is needed for efficient outcomes, rather than planning for specific reductions in each sector.

A 26% reduction below the business-as-usual trajectory at 2020 could mean a slight reduction below current emissions levels, while a 41% cut would mean a significant reduction. For instance, under both DNPI projections and trend extrapolation from current data (Figure 1), a 26% and 41% reduction relative to business-as-usual implies a reduction of around 6% and 24% respectively below 2005 emissions levels. These are significant challenges, in the face of rapid economic growth – but with the right policy approaches they could be achieved.

Box 1 The importance of business-as-usual scenarios

A "business as usual" (BAU) scenario is a hypothetical trajectory for future carbon emissions in the absence of policies and other measures to reduce emissions. In contrast, policies with other objectives – such as energy security – are included in the BAU.

Many of the proposals for developing country action that are currently discussed in international negociations define emissions targets relative to a BAU baseline. The BAU scenarios are therefore central to the actual effort required to achieve any emissions reductions as part of such proposals. Fo Indonesia, the BAU concept is already central given the announcement of a target of 26% or 41% emissions reductions relative to BAU.

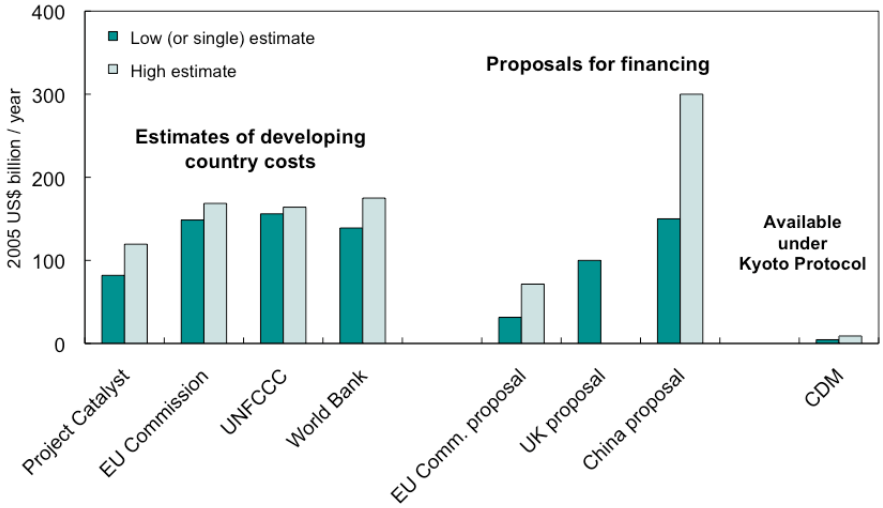
There is no single objective BAU scenario, because it depends on projections of future economic growth, structure and technological development. In agreeing emissions targets, the underlying BAU scenario and the deviation from it are both crucial.

INTERNATIONAL CARBON FINANCE

Indonesia could attain a larger share of international carbon finance than it has to date.

In an increasingly carbon-constrained world, there is likely to be an expansion of both private market and public finance to support climate change mitigation in developing countries (Figure 2). If suitable mechanisms are put in place internationally and domestically, Indonesia could be a major recipient of such finance. Indonesia currently accounts for less than 2% of the Clean Development Mechanism market, but might be able to attain 10% of much larger future carbon finance flows, based on its share of emissions.

Figure 2 Carbon finance needs in developing countries, financing proposals, and the size of the Clean Development Mechanism



Attracting carbon finance inflows is not an end in itself for Indonesia. Rather, international finance should be seen as an important factor in enabling Indonesia to restructure its economy in readiness for a low-carbon future.

Attracting carbon finance is not an end in itself, rather, it can assist Indonesia prepare for a low-carbon future.

To ensure that international mechanisms are favorable to its interests, Indonesia needs to continue to engage actively with international forums such as the UNFCCC and the G20.

There is a role for both public and private carbon finance. Public finance is particularly important in the short term, before private markets are fully functional. Public finance should be used to support capacity building, institutional reform, and the up-front financing of mitigation initiatives, and to facilitate transformational change.

Private markets, driven by demand from developed countries' emissions trading schemes, could provide the mainstay of carbon finance in the medium term. More broadly based carbon finance mechanisms, such as sectoral targets and crediting, can assist Indonesia to benefit from this global development (Box 2).

Box 2 A shift to broad-based carbon market mechanisms

New broad-based mechanisms are under discussion for framing developing country mitigation actions and to base carbon market financing on, for example, sectoral targets and crediting mechanisms. These mechanisms are more comprehensive than project-based mechanisms such as the CDM. They are likely to be preferred by the main buyers of emissions credits, and could also be highly suitable for developing countries that implement carbon reduction policies.

Both the carbon pricing policy and the Regional Incentive Mechanism described below are examples of broad-based interventions in the economy intended to internalize the unpriced externality of carbon emissions. It is in Indonesia's interest that links to international finance be similarly broadly based.

The cornerstones of an international carbon finance strategy, based on the agenda of supporting longer-term economic reform and development objectives, include the following:

- Strive for good access to international private carbon finance, by supporting the creation of broad-based, effective new carbon market mechanisms that match domestic policy initiatives, including a no-lose target for Indonesia's fossil fuel emissions. Ensure that an adequate proportion of emission reductions triggered by government policies can be sold in international carbon markets, and are sold at market prices.
- Strive for public carbon finance to be available to Indonesia, particularly in the short term until private markets are fully functional. Ensure that it is additional to existing aid and multilateral financing, that emission reductions assisted by public finance can be sold in carbon markets or count toward Indonesia's target rather than other countries', and that climate loans are strongly concessional. Support new sources of public carbon finance, such as a global levy on air and sea transport or the auctioning of emissions allowances in industrialized countries.
- In global developments toward the creation of a funding mechanism for reducing emissions from deforestation and forest degradation (REDD), support market mechanism that involve a national approach with subnational implementation, and broad coverage of emissions sources. Secure access to public REDD financing particularly in the start-up phase and for specific activities like improved peat land management.

Suitable strategies for Indonesia include: proposing a no-lose target for fossil fuel emissions; ensuring appropriate value is obtained from permit sales; and supporting the creation of an REDD mechanism with sub-national implementation

ENERGY AND CARBON PRICING

Energy is a development issue for Indonesia. Total energy demand is growing by around 7% per year, as the transport and industrial sectors grow, and as households become more affluent.

The electricity generation capacity is struggling to expand quickly enough to keep up with this demand. Substantial capacity expansion programs have been put in place over the last few years, but the projected increases in demand will continue to grow strongly as Indonesia's economy develops.

Significant price distortions remain in the energy sector and climate policies provide an opportunity to enhance economic efficiency in addition to reducing emissions

During the last decade, the emissions intensity (that is, the quantity of greenhouse gas emissions per unit of energy consumed) of Indonesia's energy sector has been rising. This is due in large part to the increased reliance on coal for electricity generation. Coal has been favored in capacity expansion because it reduces Indonesia's dependence on foreign oil imports, and because it is seen as the cheapest source of electricity. However, the assumption that coal is the

cheapest source of electricity omits important economic factors that affect the economy and the government budget.

Introducing carbon pricing is necessary in the medium to long term to achieve emissions reductions at least cost.

The mainstay of efficient reform of the energy sector should be to ensure that economic price signals are transmitted accurately through the market. This amounts to ensuring that explicit and implicit subsidies do not distort relative prices and induce "wrong" investment or consumption decisions. In addition, it does not cost producers anything to emit carbon at present, so economic agents act as if emissions were free. This means that there is no pressure to reduce emissions, and so emissions will naturally grow.

Efficient mechanisms for modifying the economy to reduce carbon emissions are to remove energy subsidies over time and to introduce a price for carbon emissions.

Removing subsidies will ensure that only energy that is worth more to users than it actually costs to produce is used, reducing emissions and increasing productivity at the same time.

Accelerated removal of energy subsidies and the introduction of carbon pricing are desirable and can be done in parallel.

Introducing a carbon price would ensure that the price of activities and goods that involve high emissions will go up relative to low-emissions alternatives. If these shifts in relative prices are allowed to flow through to users, they will induce a shift in activity away from high-emissions activities, toward low-emissions activities. In this way, the lowest-cost abatement options available in the economy are selected and emissions abatement is achieved at least cost (see Box 3).

Thus, both accelerated removal of energy subsidies and the introduction of carbon pricing are desirable. However, note that introducing a carbon tax/levy is not contingent on removing energy subsidies first, it can go hand-in-hand with phasing energy subsidies over time. A carbon tax/levy can provide an immediate price signal to shift to lower carbon options in power supply and industry, and would create a forward price signal taken into account in investment decisions.

Box 3 Emissions pricing versus other policy options

Once emissions pricing is introduced, any abatement option that costs less than the carbon price will become economically favorable, and abatement options that are more expensive than the carbon price will remain unfavorable. The automatic selection of least-cost abatement options through a carbon price contrasts strongly with emission reductions achieved through specific regulatory interventions, or more piecemeal fiscal policy interventions. These require policy-makers to single out a particular abatement option without any guarantee that there are no lower-cost options available elsewhere in the economy.

That said, the application of emissions pricing is limited due to the difficulty of measuring and accounting for carbon in the agricultural and land-use change and forestry sectors. In addition, a number of obstacles prevent the market mechanism from selecting abatement options on the basis of price. There is therefore a legitimate and strong role for measures to complement carbon pricing, such as providing incentives for additional energy efficiency savings and the deployment of low-emissions technology. Measures to offset the effects on households and businesses of price rises associated with carbon pricing also have a legitimate role in complementing carbon pricing.

A suitable strategy is to introduce a modest carbon tax/levy on fossil fuel combustion initially.

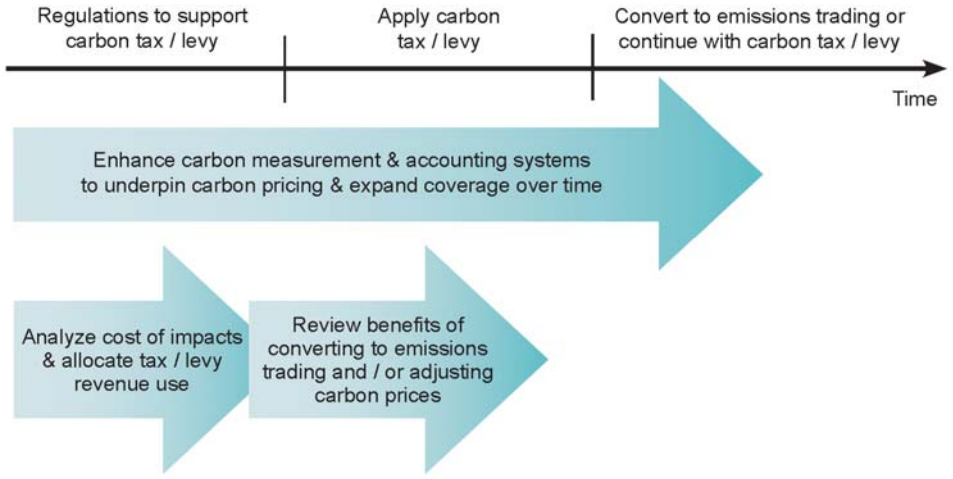
The recommended strategy is to introduce carbon pricing through a relatively modest carbon tax/levy initially. Once carbon measurement and accounting systems capable of supporting emissions pricing have been extended beyond fossil fuel combustion, drawing in more potential market participants, the carbon

tax/levy could be replaced by emissions trading, potentially with direct linkages to international carbon markets.

Coverage can be expanded and the tax/levy replaced with emissions trading as the measurement systems are further developed.

To underpin the introduction of carbon pricing, regulations would need to be put in place (see Figure 3).

Figure 3 Sequencing of the introduction of carbon pricing



In the case of Indonesia, energy prices are regulated for many energy users, which means that the carbon price signal does not get passed through to energy and energy intensive goods. However, in order to have an effect on investment and consumption decisions, the carbon price does need to be passed through.

As an indication of magnitude, the carbon tax/levy could start at a level of Rp 80,000 per tonne of CO_2, and rise at a rate of 5% (real) per annum to 2020.

This measure is projected to reduce emissions from the energy sector by around 10% from business-as-usual levels by 2020, assuming full carbon price pass-through. By then it could produce a taxation/levy revenue stream of around Rp 95 trillion per year (in today's terms).

Carbon pricing could yield large new revenues, which can be used to assist business and poor households, as well as for additional climate change measures.

The revenue from a carbon tax/levy would accrue to the budget and can be used as the government considers appropriate. That said, the suggested strategy is to use the revenue to assist the process of reform and help alleviate the impact of higher prices on the poor.

Cash transfers directed at poor households and tax reductions (of the most distorting taxes) can improve income distribution. The revenue can also be used to compensate businesses for losses incurred through the carbon tax/levy, either through direct compensation or by using the revenue to promote efficiency-enhancing reforms that make it easier for affected firms to do business (see Table 1). The revenue from the carbon tax/levy can also be used to support additional abatement incentives, where this is economically sound.

Table 1 Average price impact of Rp 80.000 carbon price, projected revenue, and possible revenue uses

	Price increase	Tax/levy revenue	Possible use of revenues
Electricity Diesel/kerosene Gasoline	Rp 60 per kWh Rp 235 per liter Rp 190 per liter	Revenue would rise to around Rp 95 trillion by 2020 per year. Additional permit export revenue of several billion dollars per year may be available	Government free to decide on revenue use. Proposed strategy: Offset the impact of price rises on households and on businesses; reduce other taxes; support additional abatement initiatives.

A carbon tax or levy could yield both a reduction in poverty rates, and an increase in GDP.

Economic modeling indicates that a relatively low carbon tax/levy, implemented while other distortions are still in existence, and with judicious recycling of tax/levy revenue, could yield both a small increase in GDP and a reduction in the poverty rate. Depending on how the revenue is used, small costs in GDP terms are also a possibility, but could be offset by exports of emissions permits to international carbon markets.

The proposed introduction of a domestic carbon tax/levy would allow Indonesia to take a powerful position to the international negotiating table, and gives it a substantial early-mover advantage. Indonesia could propose that, as part of its 26% unilateral emissions reduction, it would create a “no-lose” target for emissions from fossil fuel combustion (see Chapter 3 for discussion of how the “no-lose” target mechanisms would work).

The no-lose target would be set somewhat below the internationally agreed business-as-usual emissions trajectory, and any reductions further below that target would allow Indonesia to sell abatement units in international carbon markets. For example, if Indonesia were to negotiate a 5% reduction below an agreed business-as-usual trajectory, and actual emissions turned out to be 15% below it, then Indonesia could sell 10% in international carbon markets.

A carbon tax/levy on fossil fuels would be a very credible and transparent tool to achieve the reductions to underpin a no-lose target.

A no-lose sectoral emissions target could yield large amounts of permit export revenue for Indonesia, and send a strong signal internationally.

If agreed to, this kind of target arrangement would create a large new export opportunity for Indonesia. Economic modeling undertaken for the Green Paper and various abatement cost curves for Indonesia, suggest that at an international price of US$30 per tonne of CO_2, reductions in Indonesia’s fossil fuel emissions in the order of 24% from business-as-usual levels would be possible. If, for illustration, a 10% reduction were agreed as the target, then such a reduction would give rise to export revenue of US$2–3 billion per year by 2020.

The price mechanism for carbon emissions is the backbone of the emissions reduction strategy in the energy sector. However, where obstacles prevent the market mechanism from selecting abatement options on the basis of price, there is a role for complementary measures to supplement the carbon tax/levy, including providing incentives for additional energy efficiency savings and the deployment of low-emissions technology.

GEOTHERMAL ENERGY

Geothermal energy stands out as an important opportunity for the Indonesian economy. Indonesia is host to 40% of the world’s geothermal resources, and has by far the largest resources of any single country. Geothermal power produces almost zero emissions and is a renewable source of energy. As the world moves

toward a carbon-constrained future, countries that can supply low-cost, low-emissions energy will have a strong competitive advantage and stand to gain economically.

There is a role for regulatory and fiscal measures to complement emissions pricing. Policies to incentivize geothermal power generation provide a case in point

Today, only around 3% of Indonesia's geothermal resources are developed. The main reason for this is that geothermal energy cannot compete with conventional energy sources, given the existing distorted price structure of the Indonesian energy sector. The distortions arising from explicit and implicit subsidies favor fossil fuel generation, to the near exclusion of geothermal.

The skewed energy production mix arising from this distorted price structure represents a genuine economic loss for Indonesia. Energy could be produced more cheaply if these distortions were neutralized. There is also a substantial danger in building energy capacity under a distorted price structure, since the long life of investments in the energy sector mean that investment decisions made under today's conditions will affect Indonesia for decades to come.

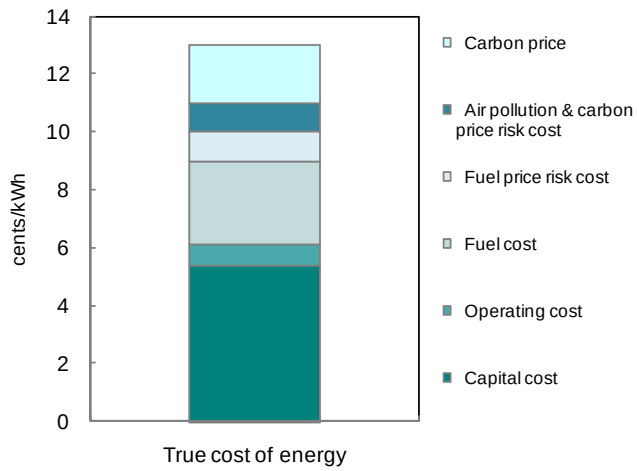
The carbon tax/levy applied to fossil fuels will go some way toward unwinding the distortions in the price structure for energy, and should make geothermal a more attractive option to energy producers. However, the proposed carbon tax/levy is modest compared to likely international carbon prices, and provides only a partial answer. In addition, there are other price distortions present in the system that need to be addressed before geothermal can compete on a level playing field.

Therefore, there is a role for complementary measures, on top of the carbon tax/levy, to promote geothermal development in Indonesia. The need for such measures is even more pronounced ahead of the introduction of carbon pricing.

In addition to a carbon price premium for geothermal power, geothermal tariffs need to reflect the true cost of electricity currently incurred by the Indonesian government.

The economic viability of a potential geothermal development can be determined by comparing its generation costs with those of conventional technologies. It is important to include *all* costs, explicit and implicit, when comparing the generation costs of geothermal and conventional (typically coal). Many, very real costs borne by the Indonesian government are not included in the simple book cost paid by PLN to the independent power producers (IPPs). For instance, price pass-through arrangements for the coal generators mean that the government pays when the coal price rises. This amounts to an implicit subsidy (essentially a coal price hedge) for coal generation and must be included when comparing the costs of geothermal and coal generation.

Figure 4 Breakdown of the true cost of coal-fired electricity



Source: McLennan Magasanik Associates modeling for the Green Paper

A reasonable and conservative estimate of the actual true cost of electricity incurred by the Indonesian government is 13 cent per kWh.

By including all explicit and implicit subsidies on top of the "book price" of electricity, the full cost of electricity generated through conventional technologies can be calculated. In practice, calculating such costs is not straightforward, suggesting a fiscally conservative approach of using a best-effort conservative value.

A value of 13 cents per kWh is taken as a reasonable and conservative estimate of the true cost of electricity, using figures from McLennan Magasanik Associates (MMA) (Figure 4) and keeping in mind that geothermal in part displaces more expensive generation technologies such as oil based generation (see Chapter 4).

In addition, other benefits of expanding Indonesia's geothermal capacity, such as greater security of supply, further enhance the value of geothermal, but the "full cost of electricity" as defined above gives a minimum price that geothermal should fetch.

It is therefore economically reasonable for the government to pay at least 13 cents per kWh for geothermal electricity with any excess profits by operators recouped through profit sharing arrangements.

Geothermal development is also hampered by other issues, such as high levels of uncertainty regarding the value of the geothermal resource in a particular area coupled with high up-front investment costs. In addition to providing better investment conditions by providing a clear and government backed tariff, the provision of enhanced exploration information is necessary.

The strategy for geothermal development has the following three pillars.

The proposed geothermal policy strategy has three pillars: enhance the information available to potential investors; provide a geothermal tariff consistent with the true cost of electricity; and institute efficient profit sharing arrangements.

1. *Enhancement of the existing pre-tender field survey and exploration studies*, to ensure that the geological data available before tender are of the highest quality possible. The data gathered from surveys and exploration before tender would ideally be added to a public geothermal database for Indonesia, which will become a valuable national asset in its own right. Indonesia's Clean Technology Fund bid would be well suited to supplying the initial funding for a revolving fund to finance confirmation drilling.
2. *Geothermal tariff.* A generic power-purchasing agreement between PLN and geothermal IPPs should be created that gives IPPs the right to sell geothermal electricity at the "full cost of electricity," as described above. Since this price may be higher than the price PLN is paying for conventional electricity, the Ministry of Finance should reimburse PLN for the difference.
3. *Profit-sharing arrangements*, applied to the IPP's profits after cost recovery, will ensure that the government obtains a fair share of the economic profits resulting from the geothermal resource, while maintaining the IPP's incentives for efficiency.

A vibrant geothermal program in Indonesia could result in healthy receipts from the sale of emissions abatement on international markets. If Indonesia can negotiate sectoral crediting across all fossil fuel emissions, as discussed above, then any geothermal electricity generated will contribute directly to reducing Indonesia's fossil fuel emissions, and hence will generate export revenue once the target is reached. If a comprehensive sectoral target is not achieved, then international carbon finance could still be accessed through other avenues, and public carbon finance can also play important complementary roles (Box 4).

Box 4 International funding models

A narrower alternative to a broad sectoral target for all fossil fuel emissions is a sectoral crediting arrangement for abatement from geothermal resources. This would also allow Indonesia to reap benefits from geothermal resources that are facilitated by government policy, by selling abatement on international markets.

This would be more desirable and more applicable than project-based access to international funding. The Clean Development Mechanism, for example, has high administrative overheads and may not apply to investments that are made viable through government policy actions.

Multilateral or bilateral financing in the form of grants or concessional loans is also likely to be available, and could among other uses help to establish a revolving fund for geothermal exploration.

REGIONAL ACTION ON LAND-USE CHANGE, FORESTRY AND PEAT EMISSIONS

Indonesia emits large amounts of carbon from land conversion, forestry and peat lands (Figure 5). The bulk of near-term emissions reductions in Indonesia are expected to come from reductions in these emissions sources.

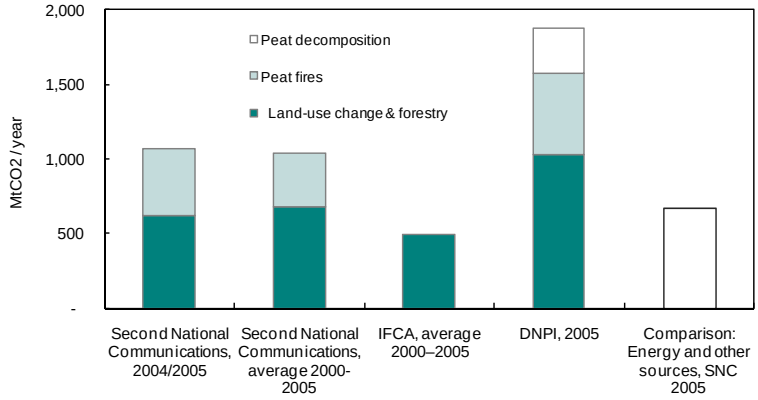
Land conversion, forestry and peat land management offer great opportunities to cut emissions.

There are plentiful opportunities to curb carbon emissions from forestry, land-use change and peat fires, by changing land-use practices, reducing deforestation, promoting reforestation, conserving peat land, and preventing fires. In many cases, the technical and opportunity cost of such measures – for example to establish a palm oil plantation on grassland rather than on forested land – would be very low. In many cases, it can be cost-competitive with alternative abatement actions even after taking into account implementation costs and the need for cushioning social impacts.

Regulatory, fiscal and budgetary measures will all be important in achieving the emissions reductions that Indonesia is aiming for. This Green Paper focuses on ways to harness the intergovernmental fiscal transfer system for the task, which is one important aspect of the overall climate policy package for land use change and forestry.

Regulatory, fiscal and budgetary measures will all be important in achieving emissions reductions.

Figure 5 Estimates of emissions from land-use change, forestry and peat for Indonesia



Sources and notes: see Figure 5.1 in Chapter 5.

One difficulty is that the people, businesses, and institutions on the ground that control land-use-change practices reap little or no direct benefit from actions to cut carbon emissions, and so lack the incentive to pursue them. Carbon mitigation policy also needs to heed local aspirations for development.

Many decisions relevant to land use and forestry management, and other aspects of climate change, are under the control of local governments in Indonesia. Hence, one avenue for promoting climate change action at the regional level is to use the intergovernmental fiscal transfer system. Through it, the Government of Indonesia could make payments to the regions to support and incentivize climate change action by regional governments.

The intergovernmental fiscal transfer system is a promising avenue to support regional climate change action.

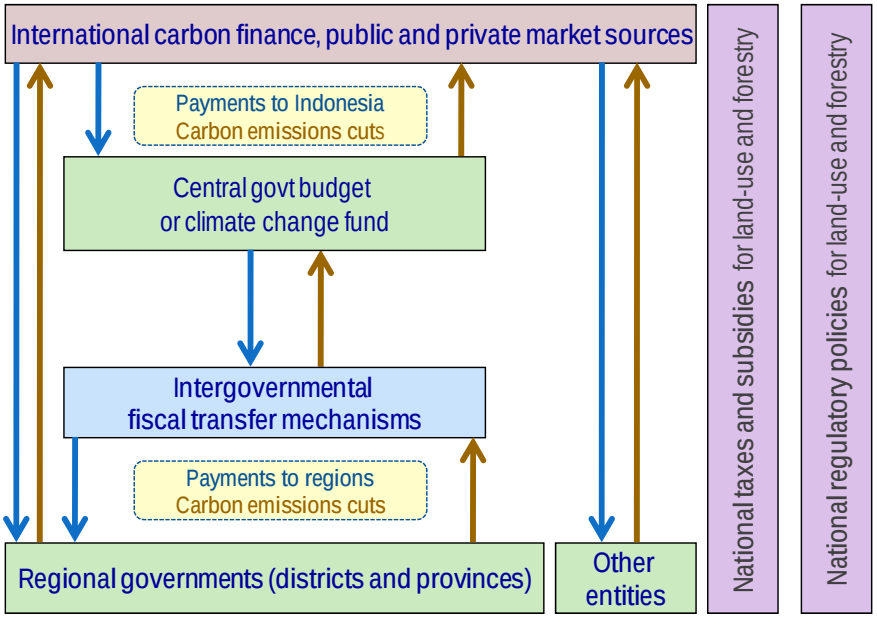
The intergovernmental fiscal transfer mechanism could also be used to channel payments for forest carbon (REDD) from industrialized countries to tropical developing countries. The intention is to put a financial value on the carbon stored in forests, and thereby change land-use decisions toward lower-emission options where this is economically sensible. REDD payments are likely to be attributed in large measure at the national level, creating the need to transfer financial incentives down to the regional and local levels.

This could be achieved through a *Regional Incentive Mechanism*, providing payments to regional governments to support climate change mitigation action, including payments linked to successful program implementation, and for carbon reduction outcomes (see figure 6, where down arrows denote monetary flows and up arrows denote emissions reductions). Regional governments would be free to take part and have full control over the design and implementation of projects, while the central government would choose the most cost-effective proposals for implementation, taking into account development priorities, possibly by way of a tendering system.

A performance based Regional Incentive Mechanism is a suitable vehicle.

The central government would manage the national and international aspects of the scheme, including management of international finance inflows from REDD. The scheme could be revenue-neutral over time, with a share of the overall international REDD payments to Indonesia covering the payments to regional governments.

Figure 6 Payment transmission under a Regional Incentive Mechanism



Capacity-building programs and pilot activities would be vital during the start-up phase, and would form the initial focus of the scheme. These could be supported through donor financing, building on existing initiatives like those under the Indonesia-Australia Forest Carbon Partnership.

Implementation could occur through existing and emerging avenues under Indonesia's intergovernmental fiscal transfer system. The first vehicle for implementation is the Special Purpose Fund (Dana Alokasi Khusus, or DAK). Climate change funding could be channeled through existing DAK programs or through new integrated climate change DAK programs, and could in future also include a reward or incentive component.

Three potential avenues for implementation exist, using current and emerging transfer mechanisms.

Another possible avenue is direct grant agreements with selected provinces or districts, for specific, agreed climate change programs and outcomes. These would also allow funding to be linked directly to international inflows of carbon financing.

A performance-based Regional Incentive Fund (Dana Insentif Daerah) for social and economic performance is planned for 2010. This transfer model provides a third option for climate change incentive payments. Payments to regional governments would be made on the basis of performance on aggregate indicators of outcomes, for example carbon emissions, area of deforestation or reforestation, and incidence of peat fires.

Box 5 Regional climate change incentives beyond REDD

The Regional Incentive Mechanism could be used as a framework to incentivize and support a wide range of locally based measures on climate change, not just forestry. Candidate activities would include energy efficiency programs managed by local agencies, improved waste management methods, and mitigation actions in agriculture. Fiscal transfers could also be used to finance local actions to *adapt* to the impacts of climate change, possibly through the channeling of international adaptation payments.

Support for climate change mitigation measures through intergovernmental fiscal transfers is only one part of an overall policy platform for carbon reductions in land-use change and forestry. There may be other channels for carbon finance to reach the local level. Further detailed analysis is needed to design financial systems for managing international carbon finance inflows as well as domestic payment distribution.

Equally important components of the national policy toolbox for curbing land-use and forestry are national regulatory measures, as well as the tax and subsidy system for land conversion, forest and agricultural industries. These regulations and policies sometimes overlap or are contradictory, and often promote high-emissions outcomes. The Ministry of Finance is currently investigating natural resource management arrangements and opportunities for fiscal and regulatory reform, with assistance from Australia.

A review and reform of fiscal and regulatory policies affecting land-use change and forestry is needed.

A systematic approach to policy review and reform – involving both the Ministry of Finance and the relevant line ministries – is needed to ensure that carbon reduction objectives are reflected in the fiscal policy settings for forestry and land conversion. A suitable strategy for the Ministry of Finance is to work with the appropriate ministries, principally Forestry and Agriculture, to bring existing fiscal policy settings into line with carbon reduction objectives.

INSTITUTIONAL REFORM

The evolution of institutions for climate change policy overseas may provide useful insights for Indonesia. Australia, for example, followed a pattern of increasing climate policy integration across government, rising involvement by the agencies of the head of government, and a central and increasing role for economic agencies in the formulation of climate policy.

In deciding where climate policy and economic input into climate policy may best be situated in Indonesia, a number of government agencies need to be considered.

- The key coordinating roles in relation to climate change are shared between the Coordinating Ministry of Social Affairs, the Coordinating Ministry of Economic Affairs, the National Development Planning Board (Bappenas), the Ministry of Environment, and the National Council on Climate Change (Dewan Nasional Perubahan Iklim, or DNPI).
- The majority of the relevant policy settings continue to be determined by line ministries and agencies, including the Ministries of Forestry, Agriculture, Environment, Energy and Mining, Trade, Industry, Transportation, Public Works and others.

Effective policy coordination is key to successful climate policy.

In practice, in such a complex institutional environment, the formulation, coordination, and harmonization of climate change policy has proven difficult. Overlapping and inconsistent formulation and implementation of policies have hampered efforts to achieve a uniform approach to climate change. Indonesia will need stronger and more effectively integrated policy formulation, coordination, and implementation to achieve the announced emissions targets without impeding development goals, and to gain access to carbon finance. The new government has an opportunity to review the existing arrangements for the management of climate change issues to ensure a more cohesive approach to policy formulation and implementation.

The Ministry of Finance is central to climate policy development and implementation, not only because fiscal and budgetary instruments matter for effective and efficient carbon policy, but more fundamentally because policies to reduce emissions can have significant economic impacts, including on state finances. In addition, the ministry has an important role to play in helping to maximize access to international climate financing and channeling payments domestically.

Ministry of Finance is central to climate policy development and implementation

The Ministry of Finance will also have a key role in the allocation of funding for climate change through the budget. As such, it will need to ensure that climate measures are economically sensible and cost effective. A useful metric in climate change mitigation is the cost per tonne of emissions reductions. Furthermore, the Ministry of Finance can assist in assuring consistency in budget allocations over time, in both medium- and long-term expenditure plans.

Indonesia's economics agencies more broadly – in particular the Coordinating Ministry of Economic Affairs, Bappenas and Ministry of Finance – have a crucial role in coordination, bringing sound economic approaches to climate policy across government, and in safeguarding the national economic interest when policy is contested by powerful interest groups (as has been the case in developed countries that have implemented climate change mitigation policies).

SUGGESTED STRATEGY

1. *Establish a climate policy unit within the Ministry of Finance.* This would strengthen its capacity to evaluate and contribute to the formulation of climate change policy. It would also include efforts to ensure consistency and effectiveness of budget allocations for climate measures. A high-powered climate policy unit as part of its formal structure is best suited for the task. It could consist of selected officers, drawing in experts from across the ministry, and possibly externally.

2. *Establish a working group on climate policy across the Ministry of Finance, Bappenas, and the Coordinating Ministry of Economic Affairs.* The working group would ensure that economic considerations related to climate change policy formulation and implementation are coordinated across government. A coordinated approach would help to establish mainstream economic principles in climate policy across government, and to ensure that Indonesia's climate policy portfolio achieves the desired outcomes at least cost and with maximum economic benefit.

3. *Encourage an interministerial review of existing legal, regulatory, and institutional structures affecting climate change policy formulation and implementation.*
   A thorough review of the impact of government rules, regulations, and institutions on climate change policy implementation is warranted, through a time-bound interministerial review. This could include recommendations to fix the issues that are identified. This is essential if a national climate change vision is to be achieved and successfully implemented.

4. *Encourage the commissioning of an integrated review of climate policy.* Good policy in a new field like climate change requires systematic analysis to explore options, scrutinize proposals, and make the latest thinking accessible to all stakeholders and the broader community.