Fulfilling Australia's International Climate Finance Commitments: Which Sources of Financing are Promising and How Much Could They Raise?

Frank Jotzo [1], Jonathan Pickering [2], Peter J. Wood [1]
[1]Crawford School of Economics and Government, Australian National University
[2]Centre for Applied Philosophy and Public Ethics, Australian National University

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Abstract
Developed countries have pledged to mobilise $100 billion per year by 2020 for climate change action in developing countries. Progress on financing is necessary to ensure broader progress on climate change cooperation. Supporting the global commitment is in Australia's interests, since climate finance can harness low-cost mitigation opportunities and help vulnerable countries in the Asia-Pacific region adapt to climate change. Based on Australia's wealth and emissions, we find that a fair share for Australia may be around 2.4 per cent, or $2.4 billion a year by 2020. We analyse possible sources of finance in Australia. Carbon markets could provide large financial flows but their short-term prospects are uncertain, and additional public finance is needed in any event. While Australia currently draws its climate finance from a growing aid budget, a large scale-up of climate change aid could raise concerns that aid is being diverted from existing development priorities. A carbon levy on international transport could provide considerable revenue and could be implemented unilaterally ahead of a global scheme. Reducing tax breaks for fossil fuel using and producing activities could raise revenue well in excess of Australia's total climate finance commitment, while improving economic efficiency and cutting carbon emissions. Further, Australia's exports of coal and other resources provide a very large tax base which could be tapped to a greater extent.

Centre for Climate Economics & Policy
Crawford School of Economics and Government
The Australian National University
ccep.anu.edu.au

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Executive Summary

Australia has committed to providing its share of climate finance for developing countries under the Copenhagen Accord and the Cancún Agreements. This report assesses how Australia could meet this commitment from public and private funding sources, with reference to the work done on global financing by the UN High-Level Advisory Group on Climate Change Financing (AGF).

Developed countries have pledged as a group to mobilise climate finance to developing countries reaching US$100 billion per year by 2020, ramping up from an initial 'fast-start' commitment of $30 billion for the period 2010-12. This is a large commitment compared for example to total aid of $120 billion in 2009, but significantly less than the estimated climate financing needs in developing countries. The total commitment comprises financing for both mitigating and adapting to climate change in developing countries, from both public and private sources.

For Australia, now one of the wealthiest countries, contributing adequately to the overall effort is part of being a responsible global citizen, and to help achieve strong global action on climate change. Climate change financing can help curb emissions in developing countries beyond what national policies and emissions markets can provide, and can assist vulnerable countries to adapt to climate change. Both aspects are directly in Australia's national interest, in that they reduce the extent and risks from climate change and limit flow-on effects on Australia.

Australia's climate finance challenge

Australia has committed $599 million to the global three-year fast-start effort, which is slightly less than 2 per cent of the global commitment. Individual countries' shares in the longer-term global effort have not yet been agreed. Based on existing pledges of international finance and a range of indicators of responsibility and capacity, we estimate that a possible range for Australia's longer-term share would be 1.9 to 2.7 per cent, with 2.4 per cent used as a reference point. The challenge therefore is to scale up from $0.2 to 2.4 billion per year over a period of just eight years. While a large sum in absolute terms, it amounts to just over 0.1 per cent of Australia's projected Gross National Income (GNI) at 2020, and is less than 2 per cent of the value of today's resource exports from Australia. The scale-up will need to take place in a fiscally responsible, equitable, sustainable and politically acceptable way. This report analyses specifically for Australia some of the options for sources canvassed by the AGF, assessing each option in terms of revenue potential, desirability and feasibility.

Private financing

Private finance could become a substantial source of funding for mitigation activities in developing countries. However, not all private finance flows may be eligible to count toward the $100 billion commitment. Transparency in reporting climate financing will be important, and detailed disaggregation of different types of funding will be desirable.

Carbon market finance could provide large yet uncertain amounts of climate finance, depending on domestic policy decisions and the domestic mitigation response, and future international carbon market mechanisms. Gross carbon market finance from Australia might be in the order of $1.0 to 3.9 billion per year by 2020, depending on how many emissions units Australia buys and at what price. The amounts are likely to be much lower, and could be zero, in early years. What proportion of carbon market flows should count towards financing commitments, given that emissions trade would help developed countries meet their mitigation commitments, is contentious. Estimates of net flows (revenue minus mitigation costs) may be useful in this respect, and may amount to between $0.2 and 1.1 billion at 2020.

Private capital flows. Climate change financing from public or carbon market sources can draw in additional private financing. Australia could provide public finance aimed at leveraging additional private finance flows, and help facilitate private climate-related investment in developing countries. The amount of private capital flows that are leveraged will generally be difficult to estimate, and no quantitative estimates are made here. They will typically be driven by commercial considerations, and it is unclear to what extent they would be eligible to count toward overall climate finance commitments.

Public financing from new sources

Public financing could be allocated to support adaptation as well as non-marketable mitigation activities in developing countries, thus filling important gaps left by private finance. Raising funds from activities that are connected to greenhouse gas emissions is particularly promising, especially where they are not or only partly covered by revenue-raising fiscal instruments. For such financing, earmarking revenue for international climate finance may be possible, which can improve reliability of financing compared to allocations out of annual general government budgets.

A **carbon levy on international transport** (bunker fuels for aviation and shipping), one of the key options for new innovative finance sources identified by the AGF, is an option of high promise for Australia. While ideally implemented globally, the analysis here shows that unilateral implementation by Australia would be feasible for international aviation, ahead of a broader international scheme. Australia could thereby make an important contribution to towards early adoption by other countries and ultimately globally.

Implementation at its simplest could be by way of a levy on jet fuel, in line with carbon pricing of domestic fossil fuels. Adverse effects on the relevant industries would be limited, and could be offset by using a share of the revenue to pay for industry-specific initiatives, for example through support for energy saving technologies, biofuels infrastructure, and tourism industry programmes. A carbon levy on international transport could contribute between $0.2 and 0.5 billion per year by 2020, after setting aside one quarter to assist industries. As more countries apply a similar levy, the need to assist industry will diminish and a greater share of the Australian revenue could be allocated to international carbon finance.

A **financial transaction tax** has been mooted as a potentially very large global new source of public finance. On the basis of AGF assumptions, a currency transaction tax for example might yield over $1 billion per year in Australia. Globally harmonized and implemented transaction taxes may be a worthwhile longer term objective. However, to avoid significant distortions in financial markets it would need to be adopted by a large share of major financial centres, which at present does not seem likely. Furthermore, there would be no clear case for using the revenue for climate change purposes.

A **share of the government revenue from carbon pricing** could be a ready, stable and efficient source of climate financing in the medium to long term. In the short term however, fiscal revenue from carbon pricing is already earmarked mainly to assist Australian households, and for transitional assistance to industry. Ramp-up of allocations to international purposes over time may be possible, in particular as assistance payments to industry are reduced. Assuming that government were to allocate between 1 to 7 per cent of carbon pricing revenue to support the international financing commitment by 2020, this could yield in the order of $0.1 to 0.8 billion per year.

Direct budget contributions

Contributions from the federal budget would need to make up any shortfall between the overall required public finance and the revenue from new sources of public financing.

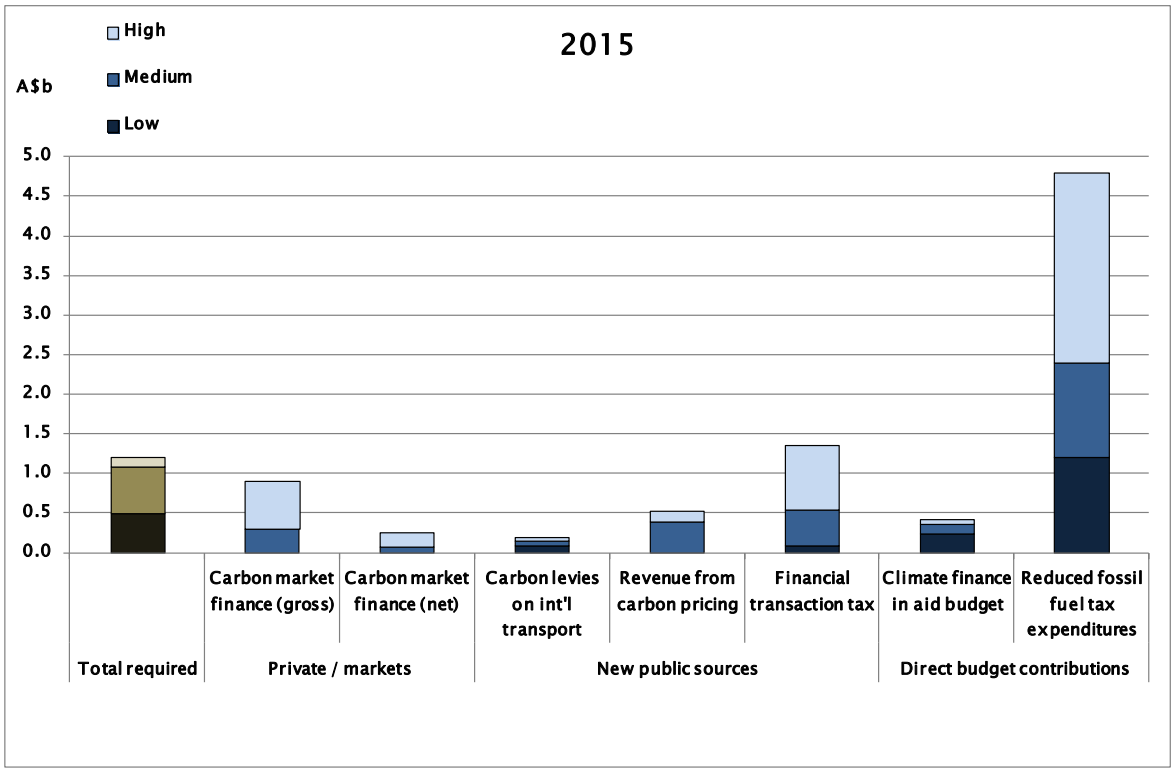
Reducing tax exemptions for fossil fuel using activities could yield large amounts of revenue, outstripping Australia's total climate financing commitment, and at the same time improve economic efficiency and help cut domestic emissions. For example, tax expenditure on just four specific tax concessions for fossil fuel using or producing activities amount to over $3 billion per year, and concessions amounting to over $6 billion per year are in place for off-road fuel use and on-road fuel use from heavy vehicles.

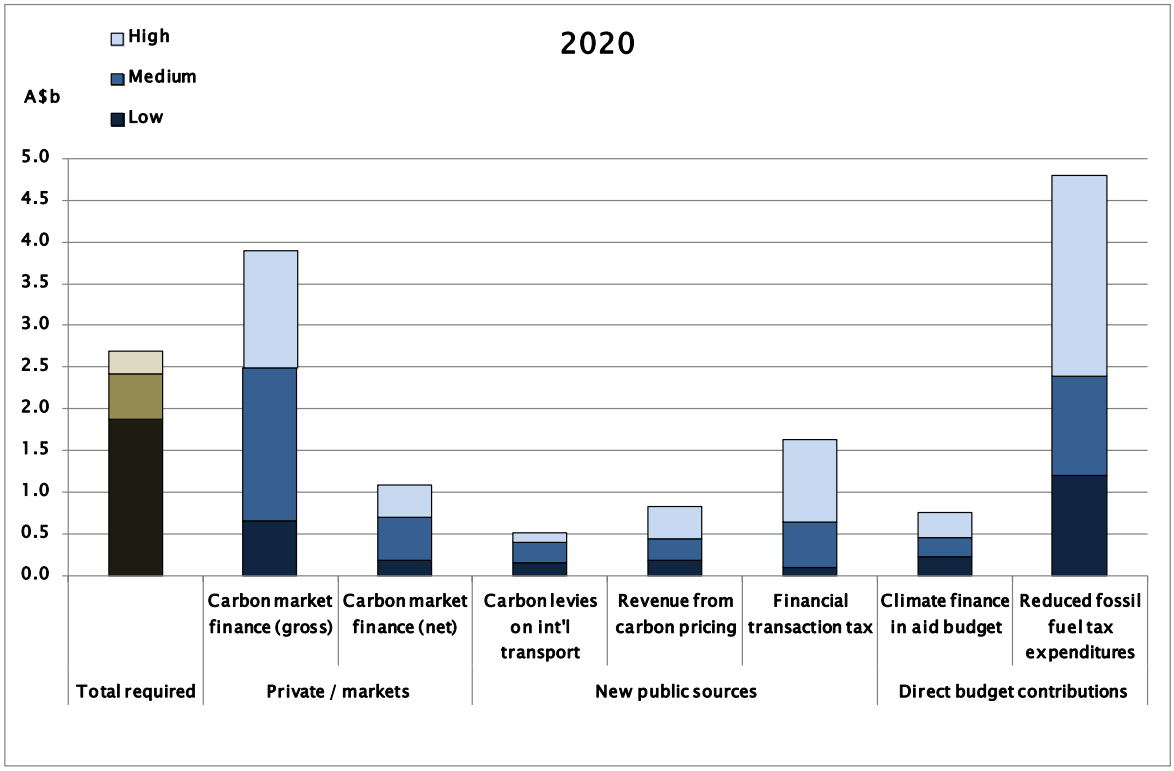
Resource taxes. In the search for potential additional sources of government revenue, the exceptionally large revenues and profits arising to businesses operating in Australia from resource extraction, including coal mining, stand out. Australia's proposed Minerals Resource Rent Tax is estimated to yield $6.5 billion in 2013-14. Larger amounts would have been raised under the government's original tax proposal, or if the coverage of the tax was expanded beyond coal and iron ore. Australia's coal exports were valued at $43 billion during 2010-11, and volumes are rising. A coal export tax of just $5 per tonne (around $2 per tonne of carbon dioxide from combustion of that coal) would cover Australia's entire climate financing commitment in 2020.

Aid funds. Australia's growing aid budget could be seen as a ready source of public climate finance. However, drawing any increase in climate finance from aid funds would require addressing concerns that aid funds not be diverted from other development purposes (the requirement of 'additionality'). Several reference points could be identified to place reasonable limits on the use of aid funds for climate finance, ranging from $0.2 billion per year (the level of Australia's existing fast-start

commitment) to $0.8 billion (if Australia's total aid grows to 0.7% of GNI and no more than 5 per cent is earmarked for climate finance) by 2020. Any reported contributions from aid funds should be disaggregated from other contributions. In addition, the overall aid programme will need to be aligned to promote climate-friendly development, for example through the mainstreaming of climate change adaptation and avoiding investments in high-carbon infrastructure.

Summary of revenue estimates – Figures





Summary of revenue estimates – Tables

		Low	Medium	High
At 2015 A$ billion (nominal)				
Total financing required		0.48	1.08	1.21
Categories	*Sources*			
Private / markets	Carbon market finance (gross)	0.00	0.30	0.90
	Carbon market finance (net)	0.00	0.08	0.26
New public sources	Carbon levies on international transport (bunker fuels)	0.08	0.14	0.19
	Revenue from carbon pricing	0.05	0.4	0.52
	Financial transaction tax	0.08	0.54	1.35
Direct budget contributions	Climate finance in aid budget	0.23	0.37	0.42
	Other (from reduced fossil fuel tax expenditure)	1.20	2.40	4.80

		Low	Medium	High
At 2020 A$ billion (nominal)				
Total financing required		1.82	2.40	2.68
Categories	*Sources*			
Private / markets	Carbon market finance (gross)	1.0	2.50	3.90
	Carbon market finance (net)	0.27	0.71	1.09
New public sources	Carbon levies on international transport (bunker fuels)	0.16	0.4	0.51
	Revenue from carbon pricing	0.05	0.45	0.83
	Financial transaction tax	0.10	0.65	1.64
Direct budget contributions	Climate finance in aid budget	0.23	0.46	0.76
	Other (from reduced fossil fuel tax expenditure)	1.20	2.40	4.80

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1 Introduction

The issue of climate finance for developing countries has become increasingly prominent in recent international climate negotiations. A global deal will require the participation of developing countries, which account for most of the projected global increase in emissions if there is no comprehensive policy action. Climate change financing can help curb growth in emissions in developing countries beyond what emissions markets can provide, and can assist vulnerable countries to adapt to climate change. Financing is a crucial ingredient in building the trust necessary to secure meaningful global participation (Rübbelke 2011). As a commentary on the recent UNFCCC meetings in Panama in October 2011 noted, 'The reality is that without explicit agreement on finance that satisfies developing countries, it is going to be difficult to agree on anything else' (IISD 2011:13).

Under the 2009 Copenhagen Accord, developed countries pledged to provide climate finance approaching US$30 billion between 2010 and 2012 ('fast-start finance'), and to mobilise US$100 billion a year by 2020.[1] These commitments were confirmed in decisions of the UN Framework Convention on Climate Change (UNFCCC) at the UN climate conference in Cancún, Mexico in late 2010.

Individual developed countries have now made pledges that will largely be sufficient to meet their fast-start commitments, drawing primarily on public funds from national budgets (OECD 2011b:40). However, given the need to scale up funding substantially after 2012, the Accord recognised that longer-term funding would need to come 'from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance'.[2]

The goal of $100 billion a year seems substantial when compared with similar current flows of global aid, but less so when compared to levels of budgetary support and tax expenditure for fossil fuels in OECD countries (see Section 7 below). As Cameron Hepburn observes, 'the carbon-finance task is not necessarily impossible: governments intervene in and distort energy markets for alleged social purposes to a much greater extent every year' (Hepburn 2009b:410). In addition, current international private investments into climate-friendly technologies in developing countries initiated outside the framework of UNFCCC commitments may already total $60-160 billion a year (Stadelmann et al. 2011:19), although such flows are currently difficult to estimate.[3]

While $100 billion a year may make a substantial contribution towards global financing requirements, it will not necessarily correspond to the full scale of financing needs. Erik Haites, for example, concludes from a review of estimates that: 'As an order of magnitude … the current estimates suggest that climate finance of at least US$200 billion per year is needed by 2030, roughly balanced between mitigation and adaptation' (Haites 2011:966; see also Parker et al. 2009; Pickering and Wood 2011).

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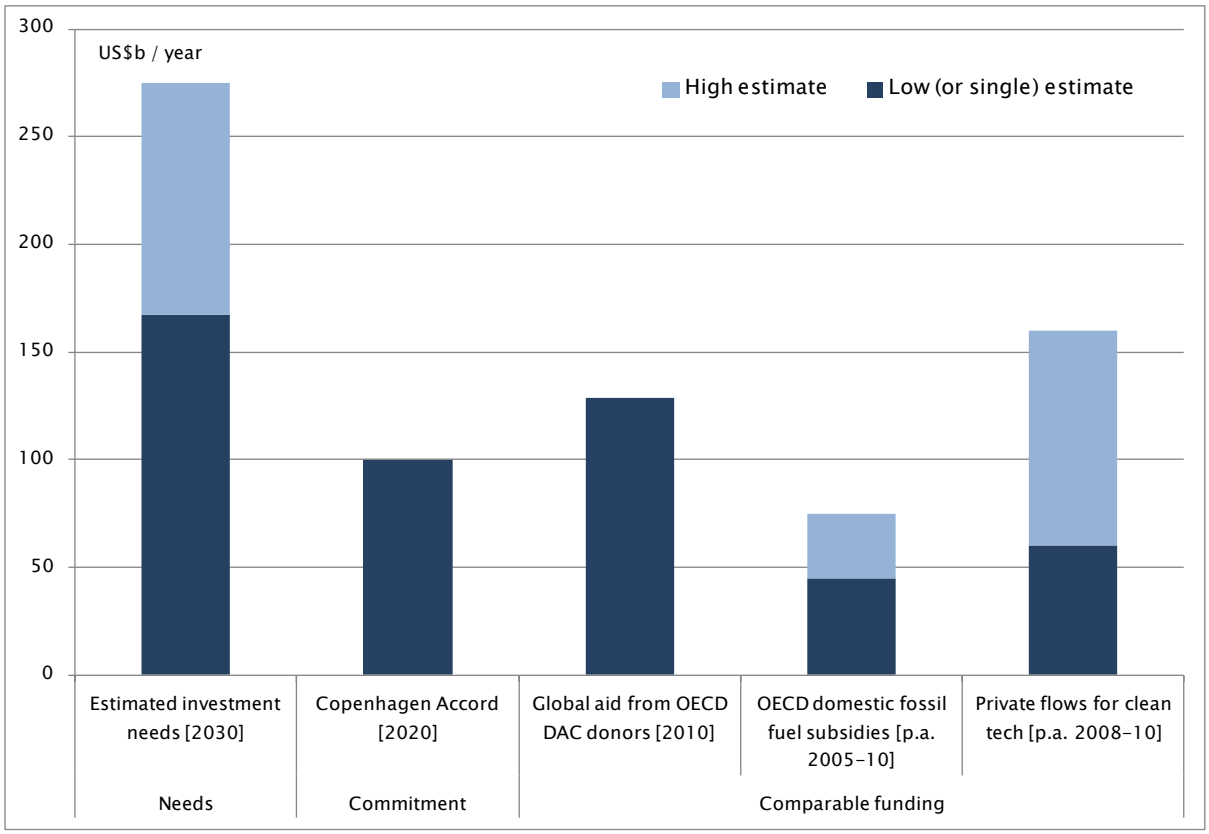
[1] Unless otherwise indicated, estimates in this report are nominal dollar amounts, assuming parity between US dollar and Australian dollar.

[2] Copenhagen Accord, Paragraph 8.

[3] The World Bank has estimated that total public and private flows of clean energy finance for developing countries (covering UNFCCC commitments as well as flows outside the UNFCCC framework) may already total $200 billion a year (World Bank 2011a:7).

Figure 1. Developing countries' climate finance needs compared with funding[4]



If the Copenhagen numbers are taken as reference points, there still remains the question as to how quickly the scale-up from $10 billion a year in 2012 to $100 billion a year in 2020 should take place. The actual trajectory will inevitably be based on a range of factors, including evolving understandings of the scale of global needs, availability of new sources, and political will to mobilise additional sources.[5]

Findings from the High-Level Advisory Group on Climate Change Financing

To address the question of sources of longer-term funding, the Accord envisaged a High Level Panel, which was established by the UN Secretary-General in February 2010 in the form a High-Level Advisory Group on Climate Change Financing (AGF). The AGF was co-

[4] Sources: World Bank 2009:263; OECD 2011a OECD 2011c; Stadelmann et al. 2011. Square brackets in graph indicate the year to which the relevant estimate applies. OECD DAC refers to members of the Development Assistance Committee of the Organisation for Economic Co-operation and Development.

[5] For an indicative trajectory used for the purposes of this report, see section 3.

chaired by the Prime Ministers of Ethiopia and Norway,[6] and included ministers and senior government officials and experts on areas such as public finance, climate economics and development. Among those represented was Bob McMullan, formerly Australia's Parliamentary Secretary for International Development Assistance and now Special Envoy for Africa (McMullan 2010). The AGF issued its report in November 2010, finding that the goal of meeting the funding goal of $100 billion a year by 2020 was 'challenging but feasible' (AGF 2010c:3).

The AGF supports using a mix of revenues to meet the goal rather than a single instrument. It places heavy emphasis on carbon pricing and carbon markets, supports new instruments like transport levies but is guarded on proposals for a global financial transaction tax, and it foreshadows continued reliance on contributions from national budgets.

The report finds that:

- revenue from carbon pricing in developed countries could mobilise $30 billion annually;
- a carbon levy or emissions trading scheme for international transport $10 billion;
- up to $10 billion from redeploying fossil fuel subsidies in developed countries or "some form of financial transaction tax";
- $10-20 billion net transfers associated with private capital flows of $100-200 billion facilitated by developed country interventions;
- $10 billion in net transfers from carbon offset markets from $30-50 billion in gross flows;
- $11 billion net from multilateral development banks translating to $30-40 billion in gross capital flows; and
- the likelihood of direct contributions from developed countries' budgets to help cover the remaining funding gap (see Pickering and Jotzo 2010).

At the subsequent Conference of the Parties to the UNFCCC (COP16) held in Cancun, Mexico in November-December 2010, parties took note of relevant reports on financing needs and options, including the AGF report (Cancun Agreements,[7] paragraph 101).

Subsequent developments and the current task for national governments

In Cancun, parties also took some steps to build a framework for longer-term financing, including agreement to establish a Green Climate Fund through which a significant portion of new multilateral adaptation funding would flow, as well as a Standing Committee on finance that would among other roles assist the COP on the mobilisation of financial resources (Cancun Agreements, paras 102, 112). However, the Cancun Agreements do not

[6] The Prime Minister of Norway, Jens Stoltenberg, took over from former UK Prime Minister Gordon Brown, the original co-chair, after the change of government in the UK following the May 2010 election.

[7] Paragraph references to the Cancun Agreements in this report refer to the relevant paragraphs of the outcome under the AWG LCA (Ad Hoc Working Group on Long-Term Cooperative Action under the Convention) (UNFCCC 2010a).

recommend any specific sources of funding nor outline a timeframe for agreement on sources.

Since Cancun, a Transitional Committee to design the Green Climate Fund has convened several times. While its mandate does not include the identification of possible sources, its design is likely to reflect the interests of many parties (especially developed countries) that it should be able to leverage or channel funds from a range of sources, including private sources (UNFCCC 2011b). The role of the Standing Committee is being debated, with developing countries arguing it should have a specific role in assisting in the identification of new sources (Philippines on behalf of the Group of 77 and China 2011), while developed countries have focused on more other functions such as periodically reviewing overall climate finance flows (Australia, Canada, Japan, et al. 2011).

Regardless of the role of the Standing Committee, it is clear that the issue of longer-term finance under the UNFCCC will need to progress in some form if other issues in the negotiations are to be resolved. With the fast-start finance period ending in 2012, developing countries are likely to expect developed countries to announce subsequent commitments (most likely for the 2013-15 period) in the near future. It is not a foregone conclusion that the process of making fast-start pledges will simply be repeated on a rolling basis, and some developed countries may prefer to refrain from making further finance pledges until developing countries pledge further mitigation actions. But since it is likely that there will not be major updates to mitigation actions in the immediate future, and any official review of mitigation actions will also take time, a set of interim finance pledges would enhance the predictability of flows and provide a signal that developed countries remain on track to scale up towards the 2020 commitment.

It is likely that parties will work towards some kind of decision on longer-term finance by the time of COP17 in Durban in November-December 2011 (UNFCCC 2011a), but agreement to establish new sources is likely to require more time.

It is now crucially important for national governments to review the available findings on potential sources in order to formulate positions that can help drive the international negotiations on this issue, and to assess opportunities for domestic policy action that can occur irrespective of the outcomes of future negotiations. Doing so, however, is doubly challenging given prevailing conditions in the global economy. On the one hand, many economies (particularly the EU and the US) continue to operate in tight budgetary circumstances, making further funding commitments for international purposes politically challenging. On the other hand, uncertainties about the future of international policies on emissions targets and trading have led to a contraction in existing carbon markets, thus reducing expectations about their potential to help meet future commitments (World Bank 2011b).

Australia's commitment, interests and circumstances

Australia has committed $599 million over 2010-11 to 2012-13 to the three-year fast-start effort, and expects to spend $1.2 billion on climate finance over the five-year period 2010-11

to 2014-15 (see Figure 2 below).[8] As a signatory to the Copenhagen Accord, Australia has also committed to contribute its share of longer-term climate finance. Australia is closely engaged in negotiations on finance, but has not yet outlined a public position on how these funds should be raised.

It is in Australia's interest to honour its long-term financing commitment. As a country vulnerable to climate change, an effective global solution to climate change is crucial to Australia's longer-term prosperity (Garnaut 2008:xix).

Mitigation action in developing countries supported through Australia's financing commitment can provide substantial additional climate benefits, in addition to international trade in emissions permits. For example, publicly provided climate finance could help enable developing countries put in place the monitoring and accounting systems needed to participate in market-based mechanisms, help provide access to low-carbon technologies, and support investments in mitigation actions that may be of very low cost but are unlikely to be covered by international emissions trading schemes, such as reducing emissions from tropical peat lands (Jotzo 2008; see also Hepburn 2009b). Climate financing thus has an important role in facilitating strong global mitigation action.

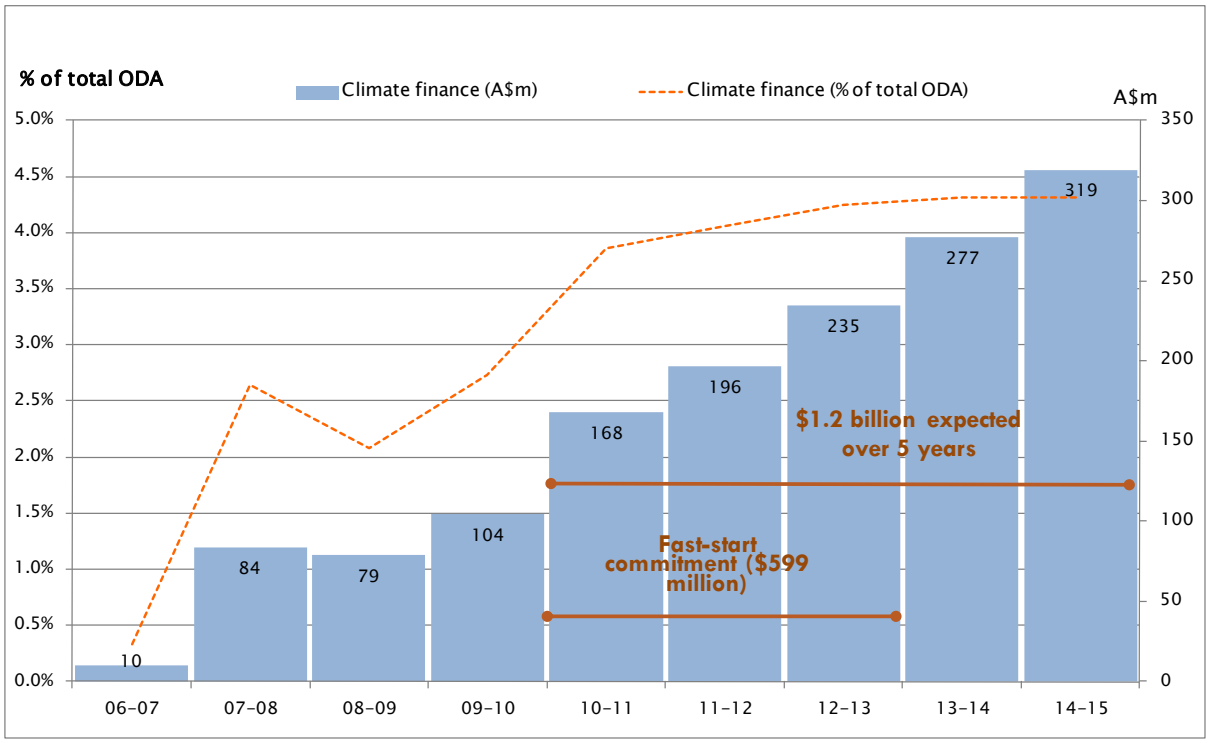
Helping vulnerable countries in the Asia-Pacific region adapt to climate change impacts is in line with Australia's objectives to support development in the region. It is also directly in Australia's national interest in that it can help reduce transnational risks that could affect Australia (e.g. the spread of infectious diseases due to higher temperatures), reduce the costs of responding to climate-induced humanitarian emergencies (compare Center for American Progress 2010:12), and lessen security-related threats that may arise from climate change (Dupont and Pearman 2006).

Australia is a wealthy country with a per capita income in 2010 in US dollar terms estimated to be the seventh-highest in the world, ahead of the United States, Japan and all the large European countries, and with purchasing power adjustment the eleventh-richest country (IMF 2011). Consequently, international expectations are that Australia will make a strong contribution to global climate finance; with Australia being well-placed to make a contribution to the financing effort without significantly compromising the wellbeing of its citizens. As a high per capita emitter, it also has a responsibility to address its share of the risks caused by the emissions that have brought about climate change (Australian Government 2011a).

At the same time, the scale-up of climate finance could place burdens on Australia's national budget, and any direct budget funding would need to go hand in hand with raising additional revenue or cutting other expenditure. To ensure acceptability and ultimately sustainability of climate financing, it is important that Australia identifies sources of funding that enable it to play its part while minimising adverse economic and social impacts.

[8] Australia announced its fast-start finance commitment in June 2010, and Foreign Minister Rudd announced Australia's expected expenditure for 2010-11 to 2014-15 (which does not have the status of a formal pledge) at the UN Millennium Development Goals summit in September 2010. For the purposes of aligning commitments between calendar years and Australia's financial year, a commitment for 2010 is taken to cover the financial year 2010-11, and so on.

Figure 2. Australia's existing climate finance expenditure, commitments and pledges[9]



The sources proposed by the AGF could interact with Australia's circumstances in a range of ways. Importantly, many of the sources proposed in the AGF report are linked to carbon pricing mechanisms, including domestic carbon taxes and emissions trading schemes (AGF 2010c:6). Australia will introduce a carbon pricing mechanism under the 'Clean Energy Future' plan, which will earmark some carbon pricing revenue for climate purposes, but not for international climate financing.

Funding drawn from other new sources canvassed by the AGF also needs to be considered in terms of its specific potential and likely economic impacts in the Australian context. For example, international transport plays a comparatively large role in Australia and hence a carbon levy may be an attractive revenue source, while impacts on overall travel and trade need to be considered.

Climate finance may have significant implications for Australia's aid program. Australia's fast-start commitment is being sourced from a projected increase in the aid program. Sourcing longer-term climate financing from further increases in the aid program could give rise to budgetary pressures, or conversely give rise to concerns about additionality of climate change funding.

[9] Indicative year-by-year allocations during the fast-start period are derived from Australian Government budget papers. Australia's fast-start commitment commenced in the final month of the financial year 2009-2010, but in order to maintain a rough split of the fast-start commitment across three financial years (rather than four), we count the June 2010 component ($15 million) towards the 2010-11 total.

Scope of the report

This report analyses selected financing options put forward by the AGF from an Australian perspective, using a similar approach to the AGF but customized to Australian circumstances and focusing on options likely to be most relevant to the Australian government. Sources will be assessed on the basis of their:

(i) likely magnitude of potential revenue;

(ii) desirability including synergies and contradictions with other policy objectives; and

(iii) institutional and political feasibility (including requisite institutional arrangements).

On this basis, judgments are made about which financing options are more promising than others, and under which conditions, but without prescription on which options should be used or what the structure of an Australian climate finance package should be.

The report also looks at what may be the magnitude of Australia's contribution to annual climate finance by 2020, including during the scale-up period from 2013 onwards, and provides an overview of methods for how flows from a range of sources could be attributed to individual countries. The present analysis starts from the illustrative assumption that public financing will account for half of the total at 2020, and that private financing will be mostly for mitigation (see Figure 4 below). Estimates of potential revenue are made for the years 2020 as well as 2015, to give a sense of how the composition of climate finance might change while ramping up the overall amount. The estimates are necessarily illustrative in nature, and are generally underpinned by conservative assumptions about revenue potential.

Consistent with the approach used in the AGF report, the analysis in this report will be based on the $100 billion a year goal. However, if financing needs fluctuate, this may result in international pressure to scale up funding commitments further. Therefore, potential sources should have the flexibility for further scaling up not only beyond 2020 but possibly before that time.

Importantly, like the AGF report, this report does not address broader issues of setting geographic or thematic priorities for allocating global climate finance or designing institutions through which it should be governed and delivered.[10] While some categories of source (in particular private and market-based finance) may imply certain types of allocation mechanisms, decisions about sources of funding can be made largely separately from the uses of that funding (Bowen 2011:1026).

The report is structured as follows. Section 2 examines what might be the required magnitude of Australia's contribution to the global climate financing effort, using indicators of responsibility, capacity and existing pledges. Section 3 details the approach to analysing different sources of financing and lists assumptions. Section 4 highlights several key policy considerations that Australia and other national governments should take into account in selecting sources. Section 5 explores the potential for private finance, through carbon market flows and private capital flows. Section 6 looks at selected new sources of public financing, namely carbon levies on international transport, revenue from carbon pricing, and a financial transaction tax. Subsequent sections discuss direct budget contributions, both in

[10] For relevant recent analysis on these issues, see for example OECD 2011b; Müller 2011; and UNDP 2011.

terms of the potential to increase tax revenue from carbon emitting activities (Section 7), and financing through the aid budget (Section 8). Section 9 concludes by highlighting promising options for an Australian financing strategy.

2 Magnitude of Australia's contribution to global climate financing

Estimating Australia's share of the global commitment: key issues

Fairness is important in climate negotiations because an international agreement is more likely to be supported if it is considered to be fair by its participants (Barrett 2003:xiv). For this reason, it is in Australia's national interest for it to contribute a share of climate financing that not only Australia considers to be fair but can also reasonably be perceived as fair by other countries (Rübbelke 2011).

Countries made their individual fast-start commitments on a relatively ad hoc basis in the form of individual pledges announced in the months after Copenhagen. It is not clear at present whether a portion of longer-term financing will be raised on the basis of a uniform scale of contribution (as proposed by some developing countries). Australia and other developed countries have emphasised that any decisions on the sources of funds that each country adopts will ultimately be up to contributing governments (see Australia, Canada, and Japan 2011, paragraph 2), and may resist efforts to be bound to particular levels of contribution. Nevertheless, it would be advisable for developed countries to build common expectations about how to share the collective burden of financing. At the very least Australia will need to develop a rationale for its own commitments that can be justified to domestic constituencies.

In order to calculate Australia's fair share, three key issues need to be addressed: (a) what is the total amount to be divided up among countries according to shares? (b) what is the composition of the group among which shares are to be divided? (c) what reasonable indicator or index could be used to generate comparable shares? Here we briefly outline the perspectives taken on these issues in the report, and further background is provided in Attachment A.

Total amount subject to fair share estimation

At present it is unclear both what the proportion of public and private sources will be in longer-term finance, and the extent to which private flows may be attributed to individual countries' commitments. For present purposes we calculate countries' indicative fair shares on the basis of total financing needs (i.e. $100 billion in 2020).

Composition of group of contributing countries

The AGF report reflects the Copenhagen Accord in assuming that only developed (Annex II) countries will be required to contribute to climate finance (AGF 2010c:26). Since it is widely recognised that UNFCCC country groupings do not consistently track relevant differences in levels of emissions and wealth, where possible we seek to identify objective measures that could help to delineate a likely group of contributors (for example by using high-income

thresholds for calculating shares of GDP[11]). However, where these aggregate figures are not readily available we rely on existing UNFCCC groupings.[12]

Indicators

Several approaches to assessing Australia's fair share could be used. Many proposed approaches identify responsibility and capacity as two key determinants of countries' shares, based on the widely cited principle in the UNFCCC of countries' 'common but differentiated responsibilities and respective capabilities' (Article 3.1) as they relate to financing (Parker et al. 2009:40-41; Dellink et al. 2009; European Commission 2011d). Our approach categorises indicators according to three main groups:

Responsibility. A country's responsibility could be based on its share of global emissions, based either on current emissions or cumulative emissions from a certain starting point. While there is considerable debate about the extent of developed countries' historical responsibility for emissions produced since the eighteenth-century Industrial Revolution (Müller et al. 2009), a number of proposals have used 1990 as a starting point.[13] We include indicators for both current emissions (up to 2008) and cumulative emissions from 1990 to 2008.

Capacity. Capacity could be based on measures such as Gross Domestic Product (GDP) or Gross National Income (GNI) (AGF 2010a:1-2, Dellink et al. 2009:414), either as an average across the whole population of a country, or an average above a certain threshold of per capita income (see e.g. Baer et al. 2008; Oxfam International 2009). We also include under the capacity indicators the Scale of Assessment for contributions to the United Nations, which is primarily based on GDP above a given per capita income threshold (AGF 2010a:1), and is used as a basis for determining contributions for some other multilateral environmental funds, such as the Multilateral Fund for the Implementation of the Montreal Protocol.[14]

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[11] See Attachment A. Compare also the Garnaut Review's proposal for funding a $100 billion Low Emissions Technology Commitment, which would involve countries contributing a certain percentage of GDP above the World Bank's high-income threshold (Garnaut 2008:222).

[12] For reasons outlined in Attachment A, rather than using the Annex II grouping for estimates, we use Annex I (that is, Annex II countries plus Economies in Transition).

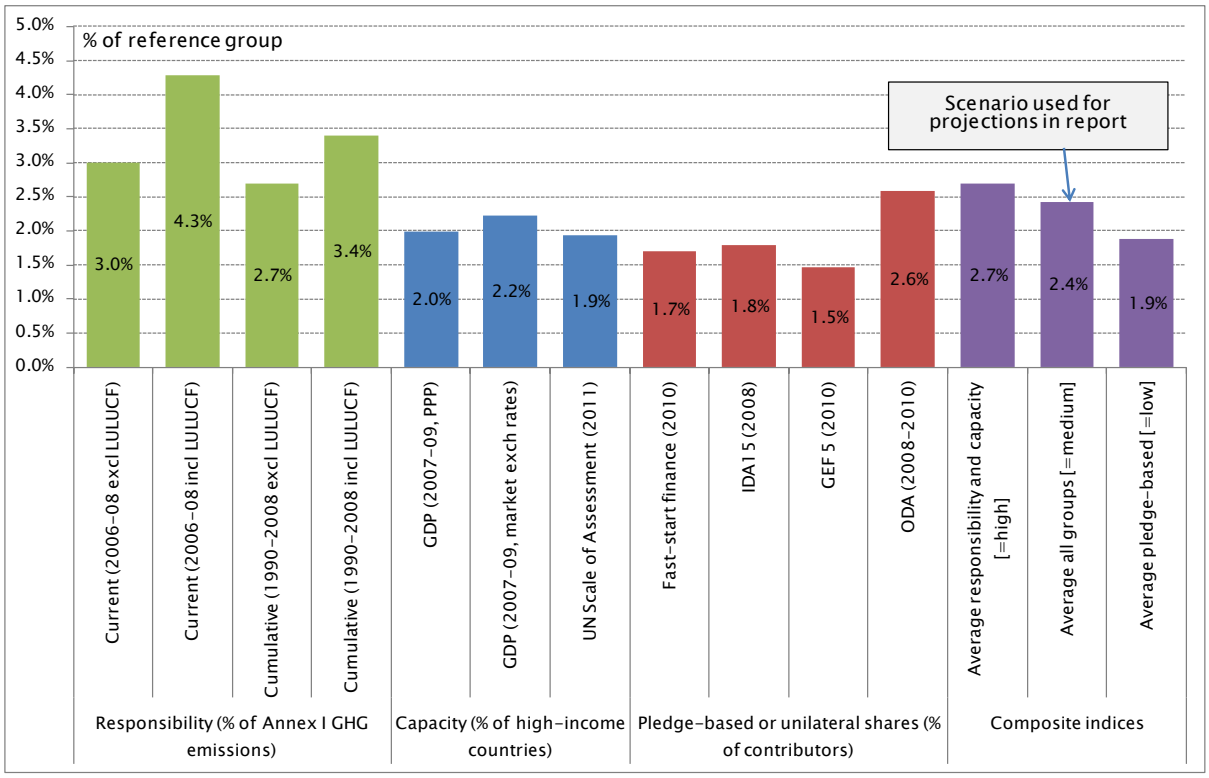
[13] 1990 is not only the base year for Kyoto Protocol mitigation commitments, but also the year in which the first assessment report of the Intergovernmental Panel on Climate Change was published, and is often seen as a point after which no country could have been reasonably ignorant of the climate risks associated with greenhouse gas emissions (Vanderheiden 2008:190; Müller et al. 2009:604). For other examples of burden-sharing proposals that use 1990 as a base year, see Baer et al. 2008 and Oxfam International 2009.

[14] This Fund supports developing countries' implementation of the Montreal Protocol on Substances That Deplete the Ozone Layer The Fund applies the UN Scale of Assessment subject to the modification that developing countries that consume less than 0.3 kilograms of ozone-depleting substances annually are not required to contribute any funds (Barrett 2007:117). This threshold also defines the group of countries eligible to receive funding, currently comprising over 140 countries (Ozone Secretariat 2011).

Pledge-based or unilateral shares. Another set of approaches involves referring to existing contributions to other multilateral funds or overseas aid. Although in some cases formal burden-sharing arrangements are agreed, they are generally pledged-based rather than tied to specific formulae linked to capacity or responsibility, and in the case of aid donor countries unilaterally decide their levels of aid rather than agreeing on levels of contribution in a coordinated forum.

Indicative shares are shown in Figure 3 below, and further details about each indicator are contained in Attachment A. To minimise the effects of annual fluctuations we have used three-year averages for certain indicators rather than single-year figures.

Figure 3. Possible indicators for Australia's share of longer-term climate finance[15]



Analysis of estimates

In general we find that Australia's burden-share under pledge-based or unilateral arrangements (approximately 1.5 to 2.6 per cent) is somewhat lower than a number of plausible objective indicators of capacity and responsibility for climate change (approximately 1.9 to 4.3 per cent). One possible reason for this is that burden-shares outside the climate regime are less likely to take account of responsibility for emissions, which are generally considered to be a significant ingredient of developed countries' climate-

[15] Key abbreviations: GHGs = greenhouse gases; LULUCF = land use, land use change and forestry; GDP = Gross Domestic Product; PPP = purchasing power parity. See also Attachment A for other abbreviations and sources.

related obligations (Dellink et al. 2009; Müller et al. 2009). In addition, using burden-shares from existing multilateral funds may understate the individual shares required to meet a given commitment, since the sum of countries' basic burden-shares frequently adds up to less than 100 per cent of the required amount.[16]

To the extent that existing burden-sharing arrangements are also used by other countries as reference points, they may provide some pointers as to how much others will expect Australia to contribute. However, arrangements that emerge through voluntary unilateral pledges can only provide a limited precedent, since the fact that such pledges have been made is not in itself a guarantee that the distribution of pledges is fair according to some objective criterion. Some other parties to the UNFCCC, notably the EU, already base their expected share on measures of capacity and responsibility rather than relying on existing burden-shares (European Commission 2011d:18).

While we do not argue that any one indicator should be the definitive reference point for Australia's fair share, we consider that any fair share should be based on a mix of capacity and responsibility. For this reason, Australia's fair share is most likely to fall somewhere within the range of these indicators. Below is an indicative range of shares based on composite indices:

Scenario	Index	Share
Low	Average of existing pledge-based contributions	1.9%
Medium *[reference scenario for report]*	Average of all groups (responsibility, capacity, pledges)	2.4%
High	Average of responsibility and capacity indicators	2.7%

The range set out above is comparable to some other proposals for Australia's contribution to global climate financing or mitigation. The Garnaut Review, for example, proposed that Australia contribute around a 2.8 per cent share of a US$100 billion International Low Emissions Technology Commitment (Garnaut 2008:222), and Oxfam has proposed that Australia contribute 2.9 per cent of global adaptation finance (Oxfam International 2007:28) and 2.3 per cent of global mitigation burden (Oxfam International 2009:31). The European Commission has estimated that under its formula, Australia would need to contribute 3 per cent of Annex I funding (European Commission 2011d:18).[17]

At the illustrative figure we use, Australia's commitment in 2020 would represent around $2.4 billion a year. While this may appear to be a substantial figure compared to some items of current expenditure, it is important to remember that $2.4 billion will be worth considerably

[16] See Attachment A for further details.

[17] The basic EC formula uses an equal weighting of GHG emissions in 2008 including LULUCF, and GDP in 2010 (measured in USD at market exchange rates).

less in 2020 in real terms due to inflation, and will represent a smaller proportion of Australia's economy due to growth in the intervening years. Even in 2010-11, $2.4 billion would represent around 0.18 per cent of Australia's estimated Gross National Income (GNI), while in 2020-21 it is estimated to represent only 0.11 per cent of GNI.

Assuming that shares should be dynamic, in the sense that they are adjusted as emissions and capacity change over time, this will lead to some fluctuations in Australia's share between now and 2020. However, we expect that the choice of indicator and any variations in the size of the contributing group will generally have a greater influence over Australia's share than variations in a given indicator over time during this period. For example, the figure based on the highest indicator is more than double than that for the lowest indicator.[18] Moreover, if the group of contributors were to remain limited to Annex II countries, Australia's share could be higher than the estimates given here.

[18] Weightings of indicator groups could also have some effect. For example, the European Commission provides estimates for different weightings for capacity and responsibility (ranging from 0–100 per cent for each), and finds that Australia's share among Annex I countries would be around 4 per cent for a 100 per cent responsibility weighting, and 3 per cent for a 100 per cent capacity weighting (European Commission 2011d:18).

3 Approach to analysing financing sources

Choice of sources and criteria for analysis

The AGF report covered four categories of funding sources: public sources, development bank instruments, carbon markets and private capital flows. This report discusses selected options in each of these categories except development bank instruments, which is out of the useful scope for analysis for a single-country study.[19] Within each category, the report focuses on particular options that seem of particular relevance and/or promise for Australia, given Australia's circumstances, existing revenue channels and policy initiatives.

Our analysis of sources for Australia is based primarily on the criteria used in the AGF report. Analysis is based on three broad dimensions of revenue, desirability, and feasibility. The criteria used in the AGF report are then grouped according to their relevance for the desirability or feasibility of the source:[20]

[19] Some commentators on the AGF report have argued that development bank instruments do not constitute a distinct 'source' as such, but rather a channel of funding (ActionAid USA et al. 2010). Increased funding through development banks would ultimately depend on increased contributions from another source. If there is increasing international pressure on development bank shareholders to step up their contributions, Australia will need to consider whether any of the other sources assessed in this report could be used to fund those contributions.

[20] Our criteria include some minor changes to the AGF criteria. We have merged the equity and incidence criteria (as the AGF report does in effect), and we have included transparency under the additionality criterion.

Dimension	Criterion	Description
Revenue		How much money could be raised?
Desirability	Efficiency	How well does the source contribute to creating a carbon 'price', and how economically distortive is it?
	Equity and incidence	Who (which countries, individuals or firms) ultimately pays? Does the financing burden fall disproportionately on developing countries or disadvantaged groups within contributing countries?
	Reliability	How predictable is the revenue?
	Additionality and transparency	Is it likely to add to or replace existing resources, and can this be readily verified?
Feasibility	Practicality	How practicable will implementation be at domestic and / or international levels (including relationship to existing instruments and policies)? What institutional arrangements are required?
	Acceptability	How politically acceptable will the source be domestically (within Australia) and internationally?

Since the criteria are largely in line with the AGF's approach, we will not elaborate each criterion in detail, highlighting only where analysis of national implications may mean additional elements need to be considered under certain criteria (see Section 4).

Assumptions for revenue estimates

We provide estimates of potential revenue from different sources under a variety of scenarios, and draw out a low, medium and high estimate for each source to allow comparison. The estimates are illustrative by necessity, but are generally underpinned by conservative assumptions about the revenue potential.

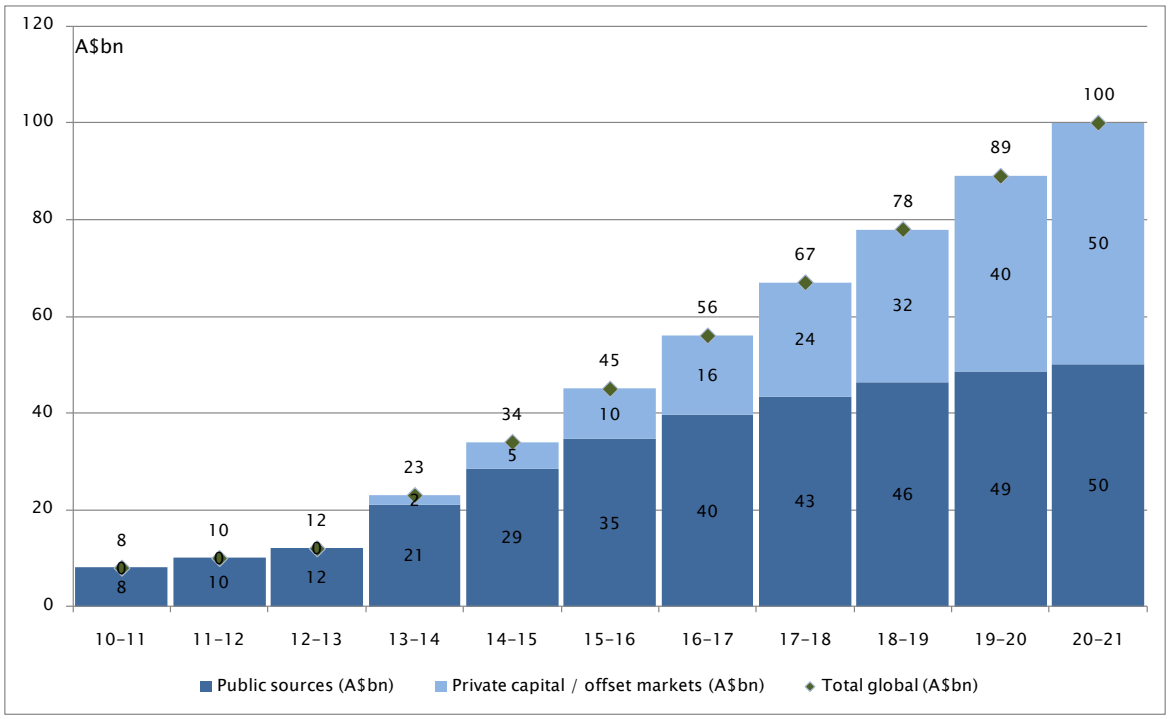
Key assumptions:

- **Monetary values:** Monetary amounts are given in current (rather than real) prices unless otherwise specified; we assume that the US$100 billion commitment is expressed in 2020 prices rather than prices at the time of commitment (2009) or some other point in time.
- **Exchange rates:** For historical figures (e.g. annual expenditure and commitments) we generally use historical exchange rates. For future projections we assume parity between the Australian and US dollar.
- **Economic growth:** For projections linked with Australia's future economic growth (e.g. aid represented as a ratio of Gross National Income), we use projections from the Australian Treasury (Australian Government 2010b and Australian Government 2010c), consistent with the latest available emissions projections for Australia (DCCEE 2011).

The roles of public and private sources in an indicative global trajectory

Consistent with the AGF report, we include flows from carbon offset markets (reporting both net and gross flows where appropriate[21]) as well as private flows facilitated by public finance, while noting the preference of developing countries for climate finance commitments to be drawn purely from public funds (AGF 2010c:9). The AGF report makes no specific assumptions about the likely mix of public and private finance, but for the purposes of our analysis we provide an indicative trajectory that enables more concrete estimation of the likely role of some sources, in particular direct budget contributions (Figure 4 below).

Figure 4. Illustrative trajectory and composition of sources of global climate finance commitments, 2010-11 to 2020-21[22]



Two key assumptions used in producing this trajectory should be noted. First, for most scenarios we assume a linear scale-up of the global commitment from 2012 to 2020.[23]

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[21] The distinction between net and gross flows is discussed in Section 4.

[22] The fast-start commitment is US$30bn over three years (2010–12) without a fixed allocation for individual years – allocation in the graph is intended to be illustrative. Note that the private and offset component does not include current flows, including from the Clean Development Mechanism (which were around $5 billion in 2010: Ecofys 2011:iv) since they do not count towards fast-start commitments, and accounting rules have not yet been agreed for the proportion of gross flows that would be counted towards future commitments.

[23] Our medium and high scenarios for Australia's commitment assume a linear global trajectory rising by the same dollar amount each year from 2012 to 2020, while our low scenario assumes an exponential global trajectory (rising by a constant percentage each year), which compared to the linear scenario gives the same figure in 2020 but a lower figure in 2015.

Second, as a rough rule of thumb we assume that private and carbon market-based sources will increase from playing a relatively small part of current flows falling under international commitments to representing around 50 per cent of total flows by 2020.[24]

[24] The AGF report that net flows of carbon market and private capital flows combined will be around US$20–30 billion a year by 2020, with gross flows amounting to $130–250 billion a year by 2020.

4 Policy considerations for national governments in selecting sources

In this section we elaborate on particular policy considerations that arise for national governments in relation to individual criteria for selecting sources.

Reliability: earmarking and the domestic revenue problem

One important aspect of the political economy of financing sources is the so-called 'domestic revenue problem' (Doornbosch and Knight 2008; Parker et al. 2009:36). The problem is that funding raised from general (or consolidated) tax revenue is in direct and ongoing competition with other domestic demands for funding, so it is typically difficult to assure ongoing funding, thus reducing the predictability of flows. Climate finance sourced through the expansion of national aid budgets (which are typically funded through consolidated revenue) would be particularly susceptible to the domestic revenue problem (compare Hepburn 2009b:411).

One possible response to the domestic revenue problem is hypothecation or earmarking of certain revenue for dedicated expenditure purposes. The example of Australia's proposed carbon pricing mechanism (Australian Government 2011), where all revenue is earmarked to be returned to households and industries, illustrates the advantages of issue-specific earmarking in communicating new revenue-raising policies to the community. Separating revenue and expenditure decisions is generally preferred in fiscal policy, since there may be a mismatch between the amount of revenue raised from a given source and the expenditure required for the earmarked purpose, and it is often considered preferable to use additional revenue to reduce other, less efficient taxes (Brett and Keen 2000). However, for revenue raised from activities that are connected to greenhouse gas emissions but not yet covered by specific revenue-raising fiscal instruments, it is more readily possible to make the case for earmarking of revenue for international climate finance. Such an approach has the additional approach of taxing an economic 'bad' (pollution) rather than a 'good' such as labour (Bowen 2011:1024).

However, the case of Australia's carbon pricing mechanism – under which no revenue is currently allocated for international climate finance – also demonstrates that given competing pressures and interests, it may still be hard to earmark a substantial amount of revenue from domestic carbon pricing for international purposes. It would be all the more difficult to do so where revenue was raised from a sector not specifically related to climate change, such as a tax on financial transactions. In addition, while earmarking may help to entrench a constituency for the continuation of a particular revenue-raising measure (Bowen 2011:1025), there are ultimately no guarantees that a particular earmarking arrangement would be retained indefinitely.

Other possible responses to the domestic revenue problem including raising funding at the international level, or relying on private sector flows. Funding raised at the international level, or under internationally agreed mechanisms, tends to be less vulnerable to appropriation.

For this reason, international sources are often seen to be more reliable, but they may be correspondingly less politically feasible to establish, particularly if they are viewed as a form of global taxation.

Private sector flows exposed to market fluctuations (whether of carbon markets or currency transactions) may also be at risk of generating unpredictable flows. In short, there are few sources if any that are likely to be completely reliable. However, if the predictability of a range of sources is affected my multiple factors that may not coincide, building a diversified range of sources can help reduce volatility of flows.

Additionality and transparency

Transparent reporting and reviewing of climate finance is important for fostering trust and ambition (WRI 2010). Here we consider two key concerns for the transparency of flows: determining plausible measures of additionality, and accounting for private flows and other funding that departs from pure grant financing.

Measuring additionality

Parties have pledged to contribute climate finance that is 'new and additional' (UNFCCC, Art 4.3; Cancun Agreements, para 97). In choosing sources and calculating the estimated revenue they will generate, a key consideration for national governments will be determining the extent to which sources are indeed new and additional.

Parties' understandings of additionality vary widely (see Stadelmann et al. 2010; Brown et al. 2010). Developing countries have proposed strict approaches to measuring additionality, based on concerns that aid and climate finance could be double-counted. Developed countries have preferred more flexible interpretations, often on the basis of the complementarities between addressing climate and development objectives,[25] as well as concerns about not penalising those countries that acted early to mobilise climate funding, but pragmatic considerations of reducing the fiscal impact of climate finance commitments have no doubt played a role too. The AGF report defines additionality as 'the extent to which new resources add to the existing level of resources (instead of replacing any of them) and result in a greater aggregate level of resources' (AGF 2010c:26). While capturing important concerns about diversion of aid, this definition is arguably so broad that it could encompass the positions of both developed and developing countries without resolving some of the specific conflicts between the two views.[26]

Recognising different understandings of additionality, we do not set out a single comprehensive definition of the term, but we seek to achieve some clarity on the issue through two approaches. First, we assume (as the AGF does) that the newness of a source of funding provides a 'useful, if partial, proxy' for additionality (AGF 2010c:26), noting however that earmarked revenue could still displace some existing revenue sources (European Commission 2011d:8; Bowen 2011:1025). Second, we assess the extent of

[25] As demonstrated, for example, by the inclusion of an environmental sustainability goal in the Millennium Development Goals (MDG7).

[26] See Attachment G for further discussion.

additionality of existing sources (principally ODA) on the basis of several plausible definitions of additionality. Each of these issues is discussed further in Section 7 and Attachment G.

Public and private sources: accounting for net and gross flows

The question of how to account for private sources of climate finance is both technically complex and politically vexed. As Stadelmann et al have shown, if a flexible definition of private flows were adopted, private climate finance flows may already exceed the target of $100 billion a year (Stadelmann et al. 2011:iv). Thus countries will need to adopt eligibility criteria that provide sufficient incentives to identify innovative sources adequate to match increasing commitments, while not taking an over-inclusive approach that lacks credibility. Developing countries have long argued that climate finance commitments should be met in the form of contributions from public budgets (OECD 2011b:30).

In addition to concerns about recourse to private flows based in principle, developing countries have raised several concerns about the accounting of private flows. First, private flows often depart from pure grant financing, in that they may involve loans or other forms of contractual arrangements. Second, not all private flows may be additional, since some would still have happened in the absence of multilateral commitments, and where carbon market financing also counts towards developed countries' mitigation targets the problem of double-counting arises.

Different types of flows will indeed have different effects on developing countries' economies, and it is important to make the distinction, as the AGF does, between 'net' and 'gross' flows of finance. The issue of net flows arises both for commercial transactions where private flows to developing countries are offset by returns to private actors (including both carbon market transactions and other private capital flows), as well as for public finance provided in the form of concessional loans. While it may be relatively straightforward to estimate the net value of concessional loans (or their 'grant equivalent') it is often much harder to estimate the net flows resulting from commercial transactions (AGF 2010c:10; Buchner et al. 2011:21).

In principle, problems of double-counting carbon offsets and adequately accounting for other private flows could be reduced by only counting the net benefits that accrued to developing countries, but typically these can only be roughly estimated, partly due to concerns of commercial confidentiality (Buchner et al. 2011:43).[27] Even net private flows could represent investments that would have occurred in any case. This concern could be addressed in part by focusing on private finance that is leveraged from public flows, but again methods for determining credible leverage ratios would need to be determined.

Transparent accounting and reporting of sources

In the light of different perspectives about what constitutes new and additional funding as well as the role of public and private finance, we suggest that reported contributions to

[27] Net flows are also referred to as inframarginal rents. For carbon markets, they represent the difference between the marginal cost of mitigation (the cost of the last unit of emissions reduced) which determines the price in carbon markets, and the (lower) cost of a specific mitigation action (see AGF 2010c:24). While the former cost can be obtained from market data, the lower cost usually constitutes commercially protected information.

climate finance should be accounted for on a net basis (compare Bowen 2011:1032), and should be disaggregated in the following way:

- *New public sources of climate financing* (including carbon levies on international transport, revenue from carbon pricing, and a financial transaction tax) could be treated as new and additional.
- *Direct budget contributions* could be considered new and additional, subject to the use of credible interpretations and baselines.
- *Carbon market finance flows*. These are clearly additional to existing budget contributions, but where they pay for the purchase of emissions entitlements under a country's mitigation commitment (national emissions target), only net flows should be included under the climate finance commitment, and only to the extent that they can be plausibly estimated.
- *Private capital flows* leveraged through public policies may be included if a suitable method for calculating leverage ratios is developed.

Feasibility: unilateral versus coordinated implementation

There is good reason for certain elements of the global architecture of climate finance to be centralised, including some arrangements for the monitoring of overall flows, and agreement on collective commitments. However, it is also likely that much of the architecture will emerge – as in the case of mitigation efforts worldwide – in a more decentralised or 'bottom-up' way, driven by unilateral initiatives and bilateral and regional cooperation (Jotzo 2010; Rayner 2010). Examples of sources that could be established unilaterally include earmarking of revenue from domestic carbon pricing and reduction of domestic fossil fuel subsidies. Examples of sources where coordinated implementation is necessary or at least highly desirable for effective implementation include the auctioning of international allowances, global levies on bunker fuels, and financial transaction taxes. It is not obvious that sources established by a top-down are better by definition than those established through a bottom-up process, but each type raises different policy considerations for national governments.

An important advantage of unilateral sources is that many can be established relatively rapidly. Provided that the source is politically acceptable at a domestic level and does not result in significant adverse impacts on other countries, its adoption will not be constrained by whether the source would have sufficient political acceptability to be established in another country as well. Even where a number of countries were supportive of a source, negotiations on coordinated implementation arrangements could nevertheless be prolonged by divergent views on design elements that would have differential impacts on different countries. Some countries may also prefer domestic sources because they can then also retain greater decision-making power over how funds are used (e.g. whether they can be delivered through their bilateral aid agencies), although as discussed below, the flipside of this benefit is the risk of other domestic interests seeking to divert funds for other purposes.

A major potential disadvantage of unilateral adoption is that their efficacy may be undermined if other countries do not likewise adopt it. This is a particular concern for proposals such as a financial transaction tax or a levy on maritime emissions. Even if concerns over leakage are not insurmountable, estimates of national revenue for particular sources need to take into account the potential effects of leakage.

Coordinated implementation may help to overcome some of these concerns. In addition, not all coordinated schemes require centralised collection of revenues but could involve collection by national governments. Nevertheless, it is apparent that some sources are likely to elude global acceptability for the foreseeable future. In particular, countries such as the United States will resist any global sources of funding that smack of global taxation. Despite these concerns, there may be some options where considerations of leakage could be reduced through implementation that is coordinated but falls short of global coverage, as long as a sufficient proportion of the global economy were to participate.

5 Private finance

Private financing could become a very large source of funding for mitigation activities in developing countries. However, its magnitude will depend on policy decisions yet to be taken, the nature and extent of future international carbon market mechanisms, and on how much private finance flow is leveraged through public financing.

Carbon market flows

Developed countries may comply with national emissions targets in part by investing in mitigation actions in developing countries, buying emissions entitlements for use towards their own reduction targets.

Australia's emissions are on an underlying growth trajectory, with the most recent official projections estimating that national greenhouse gas emissions would grow to 24 per cent above 2000 levels by 2020, in the absence of additional policy measures such as the carbon pricing mechanism proposed under Australia's Clean Energy Future plan (DCCEE 2011). When compared to Australia's announced emissions reduction target range of –5 to –25 per cent, the reduction task is large. The cost-effective strategy for Australia to achieve any reduction target by 2020 is likely to include purchases of emissions entitlements from overseas.

Australia's carbon pricing mechanism will provide for international linking when it transitions to a cap-and-trade emissions trading scheme in July 2015. Under these arrangements, up to half of a liable party's compliance obligation can be met by surrendering international units.

Mechanisms. Market mechanisms for trade in emissions are in place under the existing Kyoto Protocol framework, including principally the *Clean Development Mechanism* (CDM). Under the CDM, developing (non-Annex I) countries can generate offset credits from specific emissions reductions projects which in turn can be sold to Annex I countries and used there for compliance with Kyoto targets. The CDM has mobilized significant financial resources related to climate change mitigation measures in developing countries, but has been plagued by the impossibility of determining additionality of emissions reductions, difficulty in determining baselines, and inevitable selectivity (Wara and Victor 2008).

Australia's carbon pricing mechanism will allow liable parties to surrender units generated under the CDM, known as Certified Emissions Reductions (CERs). However it will exclude CERs sourced from a range of projects.[28]

New market mechanisms are likely to expand on existing mechanisms in scope and scale (Figueres and Streck 2009; Bakker et al. 2011). The Cancún Agreements took steps in that direction, including provisions for developed countries to support nationally appropriate mitigation actions (NAMAs) in developing countries, which in turn could take the form of a sectoral baseline-and-credit approach and thus also incentivize policy measures. Reducing emissions from deforestation and forest degradation (REDD+) in developing countries is another potential future source of carbon market finance. Trading on the basis of economy-wide emissions targets in developing countries is conceivable.

In the absence of a binding global climate treaty with trading, it is conceivable that countries that have mutually compatible interests in buying and selling emissions entitlements join in bilateral or regional groupings and make their own arrangements (Garnaut 2011:31), which could go beyond the mechanisms agreed globally under the UNFCCC.

Carbon market payments are typically thought of as private market transactions, usually between businesses in different countries. However, governments may well account for a large share – and in some cases all – of carbon market finance, insofar as they trade emissions entitlements on behalf of the country as a whole.

AGF international revenue estimates. For a medium carbon price the AGF estimates US$38-US$50 billion in gross revenue (AGF 2010c:34). The report notes that 'this would require a high level of mitigation ambition in developed countries, with correspondingly tight caps'.

These payments are 'gross' payments in the sense that they would have to cover incremental costs of mitigation in developing countries, which will typically be lower than the total payments, but are difficult to estimate (Buchner et al. 2011). The AGF assumed that this might translate to US$8-$14 billion in net revenue, where net revenue is defined as inframarginal gains, or total revenue minus costs of mitigation action to free up emissions entitlements for sale.[29]

Australian revenue estimates. Modelling by the Australian Treasury (2008) showed Australia importing international emissions entitlements under each of their modelling scenarios, with gross financial flows for purchases between $1.4 billion and $5.2 billion per year by 2020 (in 2005 prices). Modelling by the Australian Treasury (2011) estimates financial flows of US$3.1 billion per year in 2020 (2010 prices).[30]

For the present report, the range of potential carbon market revenue from Australia is illustrated through scenarios that combine a range of assumptions about international trade flows (as a function of Australia's emissions target and the extent of domestic emissions

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[28] Nuclear energy projects; certain industrial gas destruction projects including the destruction of HFC-23; large-scale hydro-electric projects; and certain time-limited land sector projects.

[29] See also Section 4 above.

[30] Using the 'core' carbon pricing scenario; assumptions about carbon prices (US(2010)$32.6 in 2020) from Chart 3.4 of the Treasury (2011) modelling; and assumptions about carbon market flows from Chart 5.2. Treasury also modelled a 'high' carbon price scenario, which will lead to flows of US(2010)$8 billion in 2020.

reductions), and the price at which such trades take place. The full range of scenarios is listed and discussed in Attachment B.

Carbon market finance from Australia ($b per year)	2015	2020
Low estimate	Zero Possible reasons: no binding national target, no compliance through international trade, domestic emissions below target	$1b gross, $0.3b net Low price, Australia at –5% target (permit price $25/t, 71 million tonnes purchased)
Medium estimate	$0.3b gross, $0.1b net Low price, Australia tracking toward base target (permit price $12/t, 23 Mt purchased)	$2.5b gross, $0.7b net High price, Australia at –15% target (permit price $45/t, 55 Mt purchased)
High estimate	$0.9b gross, $0.3b net Medium price, Australia tracking toward medium target (permit price $25/t, 37 Mt purchased)	$3.9b gross, $1.1b net Medium price in international markets, Australia at –15% target (permit price $35/t, 111 Mt purchased)

Scenarios that are considered plausible show carbon market finance in a range between $1 billion and $4 billion at 2020. Net flows (after subtracting mitigation costs) may then be between $0.3 billion and $1.1 billion, applying the AGF assumption that carbon market net flows amount to 28 per cent of gross flows. For 2015, the estimated plausible range is from zero to $1.1 billion gross flows, or $0.3 billion net flows.

The amount of carbon market finance revenue is highly sensitive to assumptions about the impact of a carbon price on Australian emissions. It is possible that carbon market finance will be zero (or close to zero), particularly in the early years of the current decade, if Australia does not yet adopt a binding target, or if the target trajectory is comparatively high in early years.

Carbon market finance from Australia could potentially be very large by the end of the decade. It could provide a significant share of Australia's total financing commitment, to the extent payments made in pursuit of meeting a national emissions target are deemed eligible also in fulfilling the financing commitment.[31] However, it appears unlikely that large market-based flows would arise in the short term.

[31] See Section 4 above for discussion of eligibility.

Desirability and feasibility

International trading in offsets and emissions allowances is in general economically desirable, as it allows emissions reductions to take place at least cost, reducing the overall cost of achieving an overall emissions outcome (Hepburn 2009a).

International trading is popular with emitters, as it gives them access to a broader range of low-cost options of meeting emissions reductions obligations. International emissions trading may face hurdles to domestic political acceptability as it is associated with the outflow of financial resources for no tangible domestic gain other than helping to fulfil a national obligation.

Efficiency can be reduced or compromised by transaction costs, limited coverage, and if claimed emissions reductions cannot be verified (Wara and Victor 2008). These aspects are particularly important for project-based mechanisms such as the CDM. Under new market-based mechanisms operating on a programmatic or sectoral basis, they are likely to be less of a problem, provided reliable methods for accounting and verifying emissions levels are in place.

The environmental integrity of offset mechanisms may be improved by way of discounting emissions credits by default factors, thus effectively requiring a larger amount of claimed reductions in developing countries than what is credited in developed countries (Bakker et al. 2011:757). This however will typically reduce economic efficiency.

Equity among carbon finance recipient countries is not assured, as carbon market finance will tend to go to the countries where allowances are most cheaply and easily sourced. For example, approximately 90 per cent of CERs under the CDM have been generated in just four countries: China, India, South Korea and Brazil, with only a very minor share going to least developed countries (Risoe 2011). There could also be significant issues around equitable distribution of potential revenue from REDD activities.

Reliability of financing flows depends on policy decisions that are yet to be taken, and on market responses. However once established, emissions markets could be comparatively reliable. Financial flows are likely to be reasonably transparent in most circumstances, but transparency issues may arise if individual countries use trading mechanisms that have not been established under the UNFCCC.

Private capital flows

Financing from carbon markets or public sources will in many instances leverage further finance from private capital markets. For the purposes of climate finance commitments, private capital flows are international flows of private finance that result from specific interventions by developed countries such as instruments for investor risk mitigation or revenue enhancement, and programs to build the capacity of developing countries to attract private finance (AGF 2010c:21).

For example, a carbon market payment that makes investment in a more expensive but lower carbon power station viable will only need to cover the incremental cost of the lower-carbon option, whereas a base amount will be provided through normal commercial financing channels. Similarly, public finance can leverage private funding – for example a

publicly financed program to support adaptation through better flood management may attract additional private finance that helps finance infrastructure.

There is a role for public finance mechanisms to leverage private investment in mitigation, as discussed among others by Ward et al. (2009), Romani (2009), and GCN (2010). Private investors in mitigation face country risks, low carbon policy risk, currency risk, deal flow problems, and difficulties evaluating multiple overlapping risks. Public finance mechanisms could use public funds to reduce these risks. These mechanisms would both increase the supply of private finance and the demand for private finance.

Ward et al. (2009) recommend a combination of five public finance mechanisms, including country risk guarantees (to cover risks such as unstable governments, civil disturbance, wars, and expropriation); insurance against changes in policies making investments unprofitable; hedging against exchange rate fluctuations; assistance with access to early-stage project development and financing; and public sector taking a 'subordinated equity stake' in low-carbon funds which gives private investors first call on income.

Multilateral development banks are likely to have an important role to play in leveraging private finance for climate change. Policies and measures by individual countries can also be important, for example through encouraging, facilitating or directing investments from pension funds in climate change related activities.

The AGF (2010c:34) estimates revenue potential from private finance to be up to $500 billion in 2020, with a leverage factor of between 2 and 4 on public flows and carbon market offsets. The AGF also estimates that if a global carbon price were to generate $200 billion in gross private capital flows to developing countries, this would lead (according to some methodologies) to net flows of $20 to 24 billion. Ward et al. (2009) estimate that each dollar of public money spent on mechanisms to leverage private finance could lead to between $3 and $15 of private finance.

These estimates are clearly subject to great uncertainty and cannot be generalised, hence no estimates of possible private capital flows are presented here.

Private investments will typically be driven by commercial considerations rather than by the objective of supporting climate change action. Thus it is unclear to what extent they would be eligible to count toward overall finance commitments.

Desirability and feasibility

Because public finance mechanisms could potentially be used to significantly increase total flows, they are a highly desirable way to spend public money.

However, distribution is likely to be skewed towards countries, sectors and projects that are intrinsically attractive for commercial investors. Private flows could provide significant finance for mitigation, but are likely to provide less finance for adaptation (Bowen 2011:1021-22). Thus many of the most pressing needs for climate change financing may be bypassed by private capital markets. Public finance mechanisms that reduce risks from investing in adaptation may be able to address this to some extent.

Leveraging private capital flows for climate change is feasible and already underway. In carbon markets, the CDM is thought to have leveraged large amounts of private capital. In the public finance sphere, examples are the World Bank's Climate Investment Funds, which aim to leverage large amounts of private finance into the activities supported by the Funds.

Additionality of private flows leveraged through other instruments could be difficult to ascertain, as private investment may have occurred anyway without support from public or carbon market funding. The amount of private capital flows could be difficult to measure, and transparency may also be difficult to establish. For these reasons, when countries report on their climate finance activity, any private flows that are leveraged should be disaggregated from other climate finance.

6 New sources of public financing

Public financing could be allocated to support adaptation as well as non-marketable mitigation activities in developing countries, thus filling important gaps left by private finance. As discussed above in Section 4, while new sources of public finance are likely to be additional, they may face other challenges such as the domestic revenue problem or the need for coordinated implementation.

Here we investigate three potential new sources of public climate change finance raised by the AGF: carbon levies on international transport fuels; a financial transaction tax; and revenue from carbon pricing.

Carbon levies on international transport fuels

Fuel use in international aviation and maritime transport ('bunker fuels') accounts for approximately 2 per cent of global CO_2 emissions. These emissions sources are not regulated under the Kyoto Protocol. Covering these sources with a carbon price could result in reduced emissions by encouraging energy savings, and at the same time provide a source of climate finance (Müller and Hepburn 2006). The transboundary nature of global air traffic and maritime transport assists the case for using the revenue from a carbon levy for international climate change efforts.

It is clearly in Australia's interest to pursue a global agreement on carbon taxation of bunker fuels. However, the analysis here shows that unilateral implementation ahead of a global scheme is possible and would likely have limited economic impacts. Inclusion of aviation emissions is particularly attractive, because fuel would need to be purchased in Australia for international flights, allowing very simple implementation through fuel taxation. Furthermore, the impact on the number of travellers would be very small, even if no mitigating measures were taken.

The AGF estimates annual global maritime emissions at 0.9-1 Gt and subtracts incidence on developing countries (approx 30 per cent), then estimates that between 25 and 50 per cent could be used for international climate finance to deliver US$4-9 billion a year (for a medium carbon price). The AGF estimates that annual global aviation emissions amount to 0.8 Gt, uses 0.25 Gt for revenue estimates, and assumes between 35 and 50 per cent can be earmarked for climate finance to deliver US$2-3 billion a year. Australian international transport emissions are projected to rise from around 12 Mt CO_2 to around 15 Mt by 2020, with over three quarters of the increase attributable to aviation and the rest to maritime transport.

If the levy were set at the same level as carbon prices assumed for the global and Australian economy overall (as in Section 5 above, $14 to $45 at 2020), this would provide revenue between $0.16 and $0.5 billion per year by 2020, and $0.1 to 0.2 billion by 2015. This assumes that only aviation is covered by 2015 and half the revenue allocated to climate finance, and for 2020 we assume coverage of both aviation and shipping with 75% allocated to climate finance. For details, see Attachment D.

Revenue for climate change financing from carbon levy on Australia's international transport ($b per year)	2015 (assuming aviation only, 50% of revenue)	2020 (assuming aviation and shipping, 75% of revenue))
Low carbon price	0.08	0.16
Default carbon price	0.14	0.40
High carbon price	0.19	0.51

There are a number of factors that may require some of the revenue to be spent on other purposes, particularly if Australia introduced a carbon levy on bunker fuels ahead of a global scheme:

- While aviation and international maritime industries will be well placed to pass on cost increases, providing some assistance to industry may promote political feasibility. Revenue could be used to assist the industry in developing and putting in place mitigation measures, for example more efficient equipment, infrastructure for biofuel supply, and improved routing procedures. Such assistance would need to be independent of fuel use and emissions in order to preserve the incentive to cut emissions.
- There could be a case to assist the domestic tourism industry to counteract any possible effects on incoming tourist numbers, for example by using some of the revenue from aviation emissions charges to support tourism infrastructure or marketing.
- There could be a case to use some of the revenue raised to support general government revenue.

If an international transport carbon levy were to be introduced globally, there would be less need to assist industry, as there would be only small concerns about competitiveness. In that case, the revenue available for international climate finance might be greater than estimated here.

The concern that air or sea traffic could be diverted to other countries is unlikely to be of significant practical concern for Australia, even under unilateral implementation. Crucially, Australia is not a major transport hub, with most cargo and passenger traffic originating from or destined to Australia. Comparing the magnitude of a carbon levy on international transport with other industry costs facilitates a tentative assessment of possible economic impacts:

- Carbon levies would have a much smaller impact on industry costs than recent fluctuations in fuel prices.[32]
- For aviation, although fuel costs are a significant share of total costs, the impact of a carbon levy on tourist passenger numbers is likely to be very small (see Attachment D). Flow-on effects on the tourism industry would consequently also be small, and

[32] Since the beginning of 2008, West Texas Intermediate (WTI) Crude oil prices have risen to approximately US$145 per barrel, declined to just over US$30, then returned to levels of over US$100 in early 2011.

assistance measures financed through a share of the levy could alleviate the impacts.

- For maritime transport, the impost from a carbon levy is extremely low compared to the value of traded goods, and small also relative to the cost of shipping, amounting on average to 15 cents per tonne of goods shipped to or from Australia under default assumptions. A study commissioned by the International Maritime Organisation (Vivid Economics 2010) finds that Australia sees relatively little impact on iron ore freight costs due to its proximity to China and its large, low-cost firms.[33]

A carbon levy on Australia's international aviation could be implemented simply through a levy on jet fuel. The levy could apply irrespective of nationality of carriers, destination or origin of flights. It would be straightforward to charge the levy at the same rate per tonne of CO_2 as Australia's domestic carbon price. Alternatively it could be charged at an internationally agreed rate. Unilateral implementation would be straightforward technically.

Fuel levies on aviation may face legal issues under the Chicago Convention (Attachment D provides details). However, it is reasonable to assume that these could be resolved, as has been done in the EU treatment of aviation emissions under its emissions trading system. In October 2011, the advocate general for the European Court of Justice argued that including international aviation in the EU ETS is permissible under EU and international law (Kokott 2011).

For shipping, unilateral implementation would equally be possible without significant distortions, because the additional cost of a carbon levy would be miniscule relative to the value of goods, and trade diversion due to emissions levies appears a remote prospect.

Technical implementation of carbon levies on shipping would need to be by way of a charge based on origin and/or destination of cargo, and emissions factors for vessels. Applying a carbon levy directly to maritime fuel would be unlikely to work, because ships can take on fuel for an entire round-the-world voyage, and unlike airplanes can choose which port to refuel at.

Financial transaction tax

Financial transaction taxes have been mooted as a potentially very large global new source of public finance, and have been supported by individual governments. A financial transaction tax (FTT) could comprise a tax on Australian foreign exchange transactions – often referred to as a currency transaction tax (CTT) – or on a broader range of financial instruments such as shares or derivatives (a securities transaction tax), or a combination of both.[34] In line with the AGF report, we analyse both options, but limit the quantitative analysis to a CTT only (AGF 2010c:62).

The AGF's estimates of global revenue potential from a CTT cover a wide range (US$2-$27 billion a year), reflecting the high degree of uncertainty about revenue estimates for this

[33] AGF (2010b) provides further useful detail.

[34] For terminology see European Commission 2011b:2. Both forms of a financial transaction tax are distinct from a Financial Activities Tax (FAT), which would be levied on the profits or remuneration of financial institutionsEuropean Commission 2011b. A recent IMF proposal favoured an FAT over an FTT (IMF 2010).

source (European Commission 2011d:32).[35] Australia accounts for around 4 per cent of global currency trading (BIS 2010:19), and we use apply this percentage to the AGF's global total to arrive at a rough figure for the revenue that could be generated for Australia, noting that the figure could be significantly lower if international participation in a CTT were limited. If the size of the global foreign exchange market remains stable between 2010 and 2020 (as the AGF estimates appear to assume), a CTT could yield between $0.1 and $1.1 billion for Australia in 2020. If the volume of Australian dollars traded increased in line with Australia's projected GDP growth rate, a CTT could raise between $0.1 and $1.6 billion in 2020.

The AGF work stream paper affirmed the technical feasibility of a CTT, since trading infrastructures already exist for tracking currency and other financial transactions electronically, and national taxes on some types of transactions already exist, for example the UK's 0.5 per cent stamp duty on share transactions and Brazil's tax on foreign exchange transactions (AGF 2010b:4; see also Brondolo 2011).

However, the AGF's work stream paper on the FTT emphasises that: 'in practical terms it is likely that an implementation worldwide is a condition for its efficiency' (AGF 2010b:6). This would not necessarily require the participation of every single country, but all major financial centres would need to be covered. Failure to do so would reduce the amount of revenue obtained as a result of both reduced coverage and potential avoidance.

A number of civil society groups and think tanks have voiced their support for an FTT.[36] However, the political acceptability of an FTT internationally appears to be a major constraint, due to the likely resistance of major financial centres concerned about potential economic impacts of such a tax. In 2011 the European Commission issued a formal proposal for an FTT (European Commission 2011c). While the proposal has received support from countries such as France and Germany, other EU members such as the UK are opposed to it and could veto its adoption (Chaffin et al. 2011). Beyond the EU, FTTs are likely to be opposed by the US, Canada, China and major financial centres in Asia. The viability of an FTT would therefore depend on whether willing countries were able to devise a coordinated approach that minimised the efficiency concerns resulting from limited participation (compare European Commission 2011d:32).

Australia is the seventh-largest centre for foreign exchange trading globally (BIS 2010:16), but since much of Australia's financial sector is built on domestic banking, a CTT may have less impact on Australia compared to other financial centres (Buckley 2010). A broad-based FTT could have more significant impacts for Australia relative to a CTT.

If an FTT were adopted, there would be particularly strong competing claims for the use of the revenue, as there is no clear connection between the taxed activities and climate change

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[35] A survey of four studies that calculate potential revenue reports estimates ranging from $20–38 billion annually for CTTs to $66–266 billion for securities transaction taxes (Matheson 2011:11). The EU's proposal for an FTT on transactions involving EU-based financial institutions (levied on shares and bonds at a rate of 0.1 per cent and derivatives at 0.001 per cent, but excluding spot currency transactions) is estimated to be able to raise €57 billion (approximately US$78 billion) a year (European Commission 2011a). Estimates for a broad-based FTT depend on a much wider range of possible parameters than for CTTs. In Australia, currency transactions account for around 40 per cent of total financial market turnover (AFMA 2010:7).

[36] Prominent recent advocates include the Robin Hood Tax campaign (http://robinhoodtax.org.au/), the Leading Group on Innovative Financing for Development (2010) and the Gates Foundation (Huffington Post 2011).

(Bowen 2011:1030). For example, financial sector taxes are already in place in several EU countries and more are under consideration, however there is no earmarking for climate change purposes, rather the revenue is used to raise general government revenue and to support specific financial sector objectives (European Commission 2011).

Despite concerns about the current feasibility and political acceptability of FTTs, globally harmonized and implemented transaction taxes – possibly alongside other harmonized fiscal revenue raising instruments – may nevertheless be a worthwhile longer-term objective.

Revenue from carbon pricing

Another potential new source of finance highlighted by the AGF is to earmark a share of the revenue raised due to a carbon price. The AGF report estimates US$8-38 billion for their medium carbon price scenario. This is based on an estimate of market size of 15 Gt per year by 2020, and 2 to 10 per cent of the value of the permits.

The amount of carbon pricing revenue available depends on the carbon price in the Australian economy, the extent to which Australia's emissions are covered by the carbon pricing mechanism, as well as the target trajectory and whether and to what extent international offsets or purchases of allowances are used. Australia's Clean Energy Future legislation (Australian Government 2011b) does not provide for carbon pricing revenue to be used for climate financing.

To illustrate possible magnitudes, we assume that between 1, 4 and 7 per cent of Australia's total carbon pricing revenue were allocated to international climate finance in the low, medium and high scenarios respectively. Coupled with assumptions about carbon prices, this gives a range between $0.1 and $0.8 billion at 2020 (medium estimate $0.4 billion), and up to $0.5 billion at 2015 (assuming that the maximum achievable share at 2015 is 4 per cent).

Attachment C provides details on assumptions and calculations.

The lower bound of 1 per cent is chosen to reflect the strong competing pressures for carbon revenue in Australia. The upper bound of 7 per cent is chosen with reference to the Waxman-Markey Bill proposing an emissions trading scheme for the US which passed the US House of Representatives (but not the Senate) in 2009. The Waxman-Markey Bill would have provided the following shares of US permit revenue to international purposes at 2020:

- Adaptation: 1 per cent (rising to 4 per cent by 2027);
- Clean technology deployment: 1 per cent (rising to 4 per cent by 2027);
- Deforestation avoidance (REDD): 5 per cent (falling to 2 per cent by 2031).

Table 1: Revenue estimates from a share of domestic carbon pricing

Revenue based on covered allocation (i.e. offsets included) ($b per year)	Default carbon price		High carbon price		Low carbon price		Strong Growth Low Pollution scenario	
Percentage of carbon pricing revenue earmarked	2015	2020	2015	2020	2015	2020	2015	2020
1%	0.1	0.11	0.13	0.12	0.08	0.09	0.08	0.08
4%	0.39	0.44	0.53	0.47	0.33	0.38	0.33	0.31
7%	n.a.	0.78	n.a.	0.83	n.a.	0.66	n.a.	0.54

Carbon pricing can be a highly efficient and reliable source of public finance for climate change purposes. It clearly is additional to existing financing. It also has the advantage that the revenue is proportional to the carbon price, thus providing greater revenue if the world embarks on stronger mitigation action. Earmarking of carbon pricing revenue is already in use elsewhere, including Germany, where part of the revenue it receives from auctioning EU ETS allowances is allocated to its International Climate Initiative (Bowen 2011:1030).

However, competition for the use of fiscal revenue from carbon pricing is tough. The competing purposes for which the Australian Government has committed to spending the carbon pricing revenue generated in the early phases of the scheme are to:

- assist Australian households with higher costs of living, which is particularly important in avoiding undesired distributional impacts of carbon pricing;
- support emissions intensive trade-exposed and other industries, which have made strong claims for assistance; and
- support climate change programmes (Australian Government 2011b).

An international climate financing component would need to come in under ‘climate change programmes’, competing with funding for domestic programmes to support mitigation. Thus it appears likely that only a small share could be allocated for international purposes initially. However, a ramp-up may be feasible over time, especially as the amount of transitional assistance to industry is wound back.

Options for earmarking. Insofar as carbon price revenue is used for international purposes, earmarking under climate change programmes would seem logical. Financial support could for example be provided to:

- specific international climate adaptation activities outside of the aid framework;
- mitigation options in developing countries that are of high promise but likely to be ineligible under market trading mechanisms; and
- climate change R&D specifically aimed at developing countries.

7 Direct budget contributions

Contributions from the federal budget would need to make up any shortfall between the overall required public international climate finance contribution and the revenue from new sources of public financing.

Direct budget contributions involve national governments allocating money from general revenue that is currently allocated for other domestic or international purposes. The large majority of global fast-start finance has been generated in the form of direct budget contributions, of which a large proportion has been drawn from aid budgets. The AGF found that budget contributions 'could continue to play an important role', despite budgets being under pressure as a result of the global fiscal environment (AGF 2010c:13). In doing so, we note that it is often difficult to obtain precise estimates of how much could be raised through these measures, since estimates will ultimately depend on assumptions about the extent of political acceptability of measures to raise revenue or cut or redirect existing spending (compare World Bank 2011a:23).

Here we consider options for Australia to finance direct budget contributions by raising revenue through reducing existing exemptions to fossil fuel using and producing activities, as well as the in-principle potential for fiscal revenue from fossil fuel extraction and exports.

Finally, we look at financing through the aid budget. We assume that direct budget contributions, like other public sources of funding, will be eligible to be counted as Official Development Assistance (ODA), even if they are not drawn from existing or projected levels of aid funding.[37]

Cutting tax exemptions for fossil fuel using activities

Direct budget contributions suffer from the domestic revenue problem: they are vulnerable to domestic demands for funding. However, increasing taxation revenue from carbon emitting activities and reducing subsidies for emissions could address this problem, with the added benefit of reducing emissions in Australia.

The AGF contends that 'billions to tens of billions of [US] dollars' could be raised from redirection of fossil fuel royalties globally (AGF 2010c:29). For Australia and other developed countries, it is common that no fossil fuel subsidies are listed (e.g. IEA 2010). This is because there is, in general, no direct subsidisation of fossil fuel use by consumers as a budget item, in contrast to many developing countries.

However, in Australia a range of fossil fuel using (as well as some fossil fuel producing) industrial activities are implicitly subsidised through exemptions from taxes that apply to similar activities in other parts of the economy. Removing or reducing these exemptions could yield substantial fiscal revenues, while also providing the potential for economic benefits through more efficient resource allocation, and setting incentives for businesses to cut back on fossil fuel use, thus helping in the national climate change mitigation task. Addressing fossil fuel subsidies is both desirable and feasible. Australia, as a member of the

[37] This issue is discussed further in Attachment G.

G20, has declared its intent to rationalize and phase out inefficient fossil fuel subsidies over the medium term (G20 2009).

Much of the subsidisation of fossil fuel in Australia involves selective reduction of taxes that would otherwise need to be paid (tax expenditures). Tax expenditures for fossil fuel using activities are described in more detail in Attachment F, and can be thought of in two categories. The first are tax expenditures *not* related to off-road purposes, including concessional fringe benefit tax (FBT) treatment of company cars,[38] concessional tax treatment of oil from the North West shelf, accelerated depreciation of fossil fuel producing and using assets, and the still prevailing exemption from excise of gas as vehicle fuel. These four expenditures are estimated to be worth over $3 billion annually today.

The second category is fuel tax expenditures for non-road vehicle use, principally mining and agriculture, as well as domestic aviation. These amount to another $6 billion annually.

The extent to which exemption from fuel taxation should be seen as a subsidy is debatable, depending on views how fuel taxation relates to government expenditure on roads. However, an efficiency argument can be made for equal taxation of transport fuels irrespective of where and for what purpose they are used.

More background on fossil fuel subsidisation and transport in contained in Attachment F.

Table 2: Tax expenditures

$b	**Tax expenditure, 2010-11**	**Tax expenditure, projected 2013-14**
Federal, not related to off-road transport		
Concessional FBT treatment of company cars	1.11	1.00
Concessional tax treatment of oil from North West shelf	0.58	0.59
Accelerated depreciation for planes, oil and gas assets and commercial vehicles	0.91	1.05
Exemption from excise for LPG, LNG and CNG[39]	0.55	0.37
Federal, related to off-road transport		
Concessional fuel excise for aviation	1.00	1.15
Fuel Tax Credits Scheme for vehicles used in Mining, agriculture and other non-road purposes	5.00	5.09
Total	*9.15*	*9.59*

This table draws on estimates from Denniss and Macintosh (2011) and the Tax Expenditures Statement (Australian Government 2011c). The estimate has been updated for changes to FBT rules in the 2011-12 budget

[38] The reforms to FBT for company cars announced in the 2011-12 federal budget result in a slight reduction of the value of FBT exemptions over time.

[39] Liquefied Petroleum Gas, Liquefied Natural Gas and Compress Natural Gas.

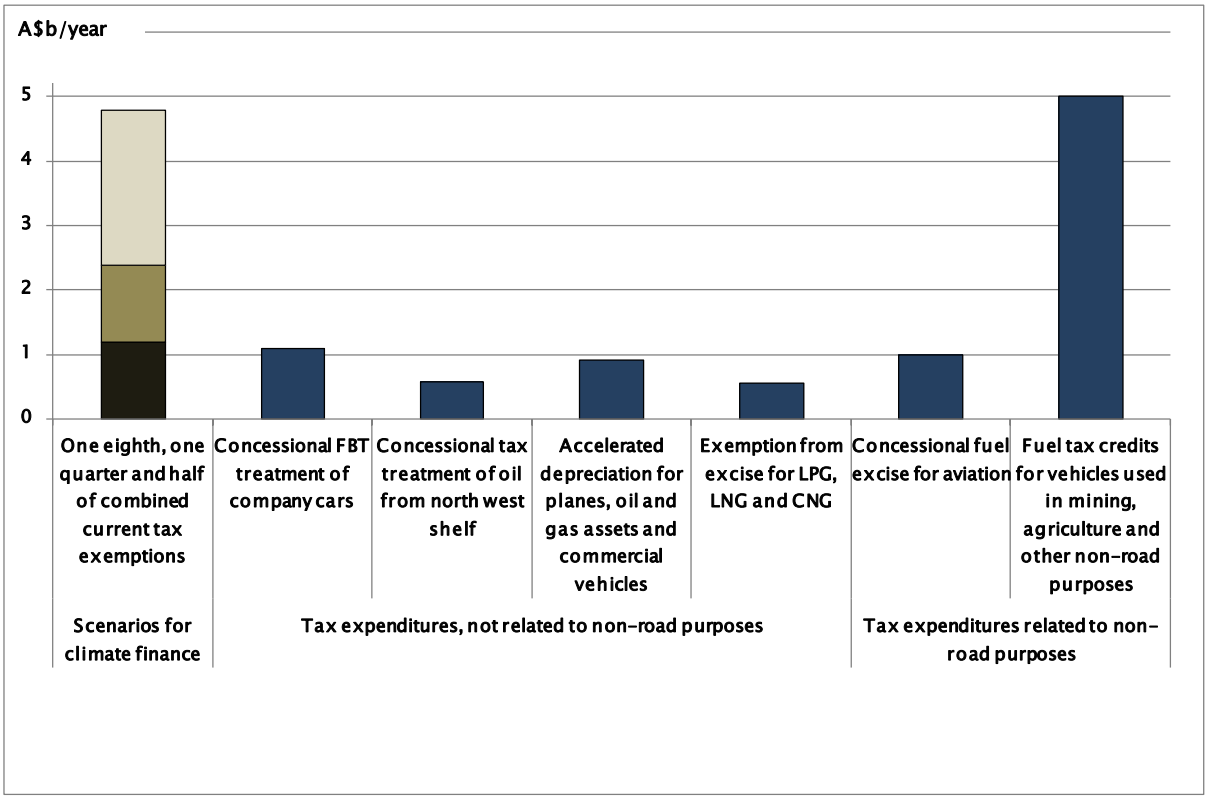
(original estimate $1.34 billion; Budget Papers 2011-12 identify savings of $0.335 billion during 2013-14); and changes in fuel tax credit estimates, which were obtained from the Budget papers (Australian Government 2011). The fuel tax credits scheme is also partially related to on-road transport because it includes credits for heavy road users (vehicles that have a gross vehicle mass of 4.5 tonnes or more) who pay a road user charge of $0.231 per litre of fuel, instead of $0.38143 per litre.

In addition to tax expenditures at the federal level, there are subsidies by State Governments for aluminium production (below-market prices for electricity) and electricity generation (below-market prices for coal). These are thought to amount to significant amounts, but data are largely unavailable. Attachment F provides further background on subsidisation and State Governments.

If a quarter of the value of current tax expenditures was allocated to international climate finance, this would fulfil Australia's entire international commitment at 2020. To illustrate potential revenue in the context of the other sources discussed in this report, we assume the following scenarios for additional tax revenue allocated to climate change financing.

- Low: one eighth of current expenditures = $1.2 billion
  (eg approximately equal to FBT concessions on company cars)
- Medium: one quarter of current expenditures = $2.4 billion
  (eg approximately equal to FBT concessions plus exemptions for fuel for domestic aviation)
- High: half of current level of current expenditures = $4.8 billion
  (eg approximately equal to FBT concessions plus exemptions for fuel for domestic aviation, plus half of fuel tax credits for current mining and agriculture)

Figure 5. Options for increased tax revenue from carbon emitting activities



Resource profits

Australia has been enjoying a sustained boom in global resources markets, with strong growth and exceptionally favourable terms of trade in the mining and energy industry in particular. The currently exceptionally large revenues and profits arising to businesses operating in Australia from resource extraction could be seen as potential revenue sources for climate change purposes.

Revenue

Large amounts of revenue could be raised by expanding the Mineral Resources Rent Tax (MRRT) or the Petroleum Resources Rent Tax (PRRT). The MRRT covers coal, as well as iron ore, which has greenhouse gas emissions associated with its processing. Australia's proposed Minerals Resource Rent Tax is estimated to yield $6.5 billion in 2013-14. A much larger amount would have been raised under the government's original tax proposal, and additional revenue could be raised by broadening the scope of the rent taxes, as suggested recently by the International Monetary Fund (IMF 2011).

A tax on carbon intensive energy exports could bring in very large amounts of revenue, with a directly connection to the climate change issue. Australia's coal exports were worth $43 billion in 2010-11, and export quantities are on a fast rising trajectory (BREE 2011, ABARES 2011). The combustion of Australia's exported coal results in roughly 0.7 $GtCO_2$ per year, more than Australia's total domestic emissions. A coal export tax of just $5/t (around $2/$tCO_2$ from coal combustion) today would yield $1.5 billion, and would cover Australia's total climate change financing commitment (using the reference point of $2.4 billion per year) by 2020.

Desirability and feasibility

Rent taxes are efficient because taxes on profits are an efficient way to tax non-renewable resources, and because they shift the tax burden to less mobile goods. These taxes do not adversely affect developing countries. The main incidence will be on shareholders of resource companies. Taxation of profits, and even more so exports, is of course highly contentious politically.

8 Financing through the aid budget

Whether aid should even be considered as a source of climate finance is a significant point of contention. Developing and developed countries continue to hold divergent views on whether the pledge to provide 'new and additional' climate funds requires a strict separation between climate finance and aid. While a large proportion of fast-start finance has been drawn from aid budgets, it will not be possible to maintain a heavy reliance on aid funds, since the scale of funding required by 2020 is too large to be absorbed by existing aid commitments without compromising other major priorities of the aid program. Provided that other sources of funding can be identified, it may not be necessary to draw on further aid funds in the longer term. However, since the international debate about the role of aid in climate finance is yet to be settled, we outline several scenarios for drawing limited funding from the aid budget and assess their consistency with Australia's commitment to provide new and additional finance.

Unlike the other sources it surveyed, the AGF did not provide a specific estimate of how much budget contributions could be expected to generate. Rather, the report implies that the magnitude of this funding will be based on the gap between total financing commitments and scenarios for implementation of other sources (AGF 2010c:31). Although direct budget contributions could help to smooth out fluctuations in revenue from other sources, there is an element of moral hazard involved in seeing aid as a primary stop-gap source. If an unrestricted proportion of the aid budget appears to be available as a fallback option, this may weaken incentives for governments to take the necessary steps to establish other sources. For this reason it is important to develop some parameters for the maximum as well as minimum role that aid could play in future.

We provide estimates for three scenarios (see Figure 6 below). In the low scenario, aid remains at the same level as Australia's fast-start finance (around $0.2 billion). In the medium scenario, contributions from aid remain at the same percentage of official development assistance (ODA) as what it will be in the final year for which Australia has outlined its expected expenditure (2014-15). This would provide around $0.4 billion in 2015-16 and $0.5 billion in 2020-21. The high scenario would permit climate finance to be sourced out of the aid budget up to a maximum of 5 per cent of total aid, which would provide around $0.4 billion in 2015-16 and $0.8 billion in 2020-21 (if Australia's ratio of aid to GNI rises to 0.7 per cent between 2015-16 and 2020-21).[40]

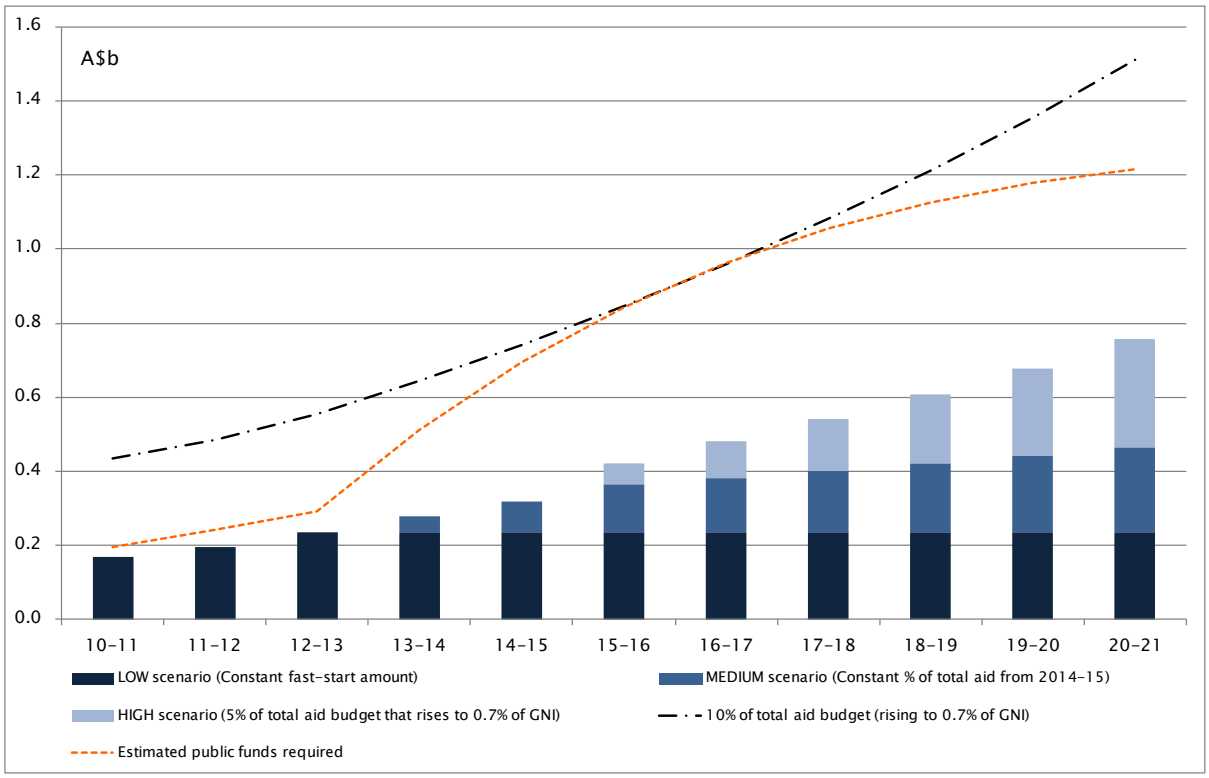
Two main concerns about the role of aid funds for meeting climate finance commitments relate to their reliability and additionality. As discussed in Section 4 above, aid, like other direct budget contributions, may remain vulnerable to pressures from other sectors of the national budget (the 'domestic revenue problem'). If contributions are linked to current national income, they could fluctuate accordingly, with contributions falling during periods of recession.

As discussed above (Section 4), the additionality of funding drawn from aid budgets is a highly contentious issue, since there is a significant risk that funds could be diverted from existing or planned expenditure intended for development purposes. While some developed countries have adopted strict definitions (e.g. the Netherlands[41]), most have opted for greater flexibility, such as whether climate finance is additional to existing aid (Australia's approach) or existing climate finance.

[40] Rationales for each scenario are outlined further in Attachment G.

[41] The Netherlands has made its fast-start finance contribution of €310 million fully additional to the 0.8% of GNI it currently spends on ODA. The fast-start pledge is in addition to another €350 million that it spends on climate change from its regular ODA budget (Netherlands 2010).

Figure 6. Options for contributions from the aid budget towards public component of Australia's commitment[42]



Australia has adopted the approach that its finance is additional since it is derived from a growing aid budget (i.e. is additional to existing aid) (Australian Government 2010a). While ensuring that as a minimum aid is not diverted from *pre-existing* expenditure levels, this approach has been criticised on the basis that *planned* aid is being diverted from aid commitments that were made prior to climate finance commitments (see e.g. Oxfam Australia 2010). A broad definition of additionality along these lines would allow Australia to meet a large part of its 2020 climate finance commitment through increases in the aid budget alone.

If Australia were to adopt the position that no longer-term climate finance should be drawn from aid, this source would simply not be part of the overall package of sources, and for this reason we have not modelled it as a specific scenario. The scenarios we model reflect the view that climate finance should in general be additional to projected aid, but given complementarities between climate and development objectives, some arguments could be made for a proportion of aid to continue to be counted towards that commitment.[43]

Although the global financial crisis has placed many national budgets under strain, Australia has fared relatively well compared to other countries, some of whom have chosen to reduce the proportion of their budgets allocated to international purposes such as aid. Within

[42] Trajectory for ODA/GNI ratio to 2015–16 is derived from AusAID 2011. ODA trajectory for the high scenario assumes a steady increase in the proportion of ODA/GNI ratio from 0.5 per cent in 2015–16 to 0.7 per cent in 2020–21. See Attachment G for further details about assumptions.

[43] The rationale for this approach is outlined further in Attachment G.

Australia there remains strong public support for the aid program. While this cannot be taken as direct evidence of the public acceptability of further increases in public spending to address climate change from general revenue, it does suggest there is a modest degree of flexibility. However, scaling up climate finance from a static aid budget may generate public distrust

9 Conclusion

Meeting the commitment to contribute a fair share to long-term global climate change finance to developing countries is squarely in Australia's national interest. Raising the funds to meet the 2020 commitment – estimated here at $2.4 billion per year by 2020 for Australia – may seem like a daunting task, especially in times of fiscal austerity and fear of more financial and economic crisis. Yet it is a necessity for progress in international climate change cooperation. And for Australia it is eminently doable.

This report has found that in addition to the large longer-term potential of carbon markets, Australia is well placed to harness several sources of public finance that will enable it to diversify beyond reliance on the aid budget. A particularly notable new possible source of finance is a carbon levy on international aviation and sea transport, which could even be implemented ahead of a broader international scheme. Any remaining contributions directly from the budget could readily be made up for by cutting tax exemptions for fossil fuel using activities, and Australia's resource exports revenues could be tapped to a greater extent. Each of these options could yield much greater revenues than Australia's total national climate change financing commitment.

Going into the climate change negotiations at Durban, it is now time for Australia to explore concrete options how to scale up its climate finance commitments and how to put them on a sustainable financial basis. Australia will find it easier than most countries to raise the funds. At the same time, Australia has more at stake in international cooperation on climate change than most other countries.

Summary Table: Comparison of sources against criteria

	Desirability				Feasibility	
	Efficiency	**Equity / incidence**	**Reliability**	**Additionality / transparency**	**Practicality**	**Acceptability**
A. Private finance						
Carbon market finance	Promotes efficient mitigation, provided sound mechanisms are used.	Equity issues in allocation of emissions sales between developing countries. No funding for adaptation.	Subject to mitigation policies of developed countries, and design and operation of emissions market mechanisms	Additional to aid contributions. Not additive with climate mitigation commitments.	Some mechanisms already in operation. Environmental integrity could be increased through discounting, and scaling up to sectoral approaches.	Depends on environmental integrity; developing country concerns about counting offsets towards financing commitments
Private capital flows	Public funds may leverage much larger private flows	Likely to reach mostly attractive investment destinations, and focus on mitigation	Subject to market and regulatory environments	Hard to estimate	Some measures already in place	Developing country concerns about counting private flows towards financing commitments

	Desirability				Feasibility	
	Efficiency	**Equity / incidence**	**Reliability**	**Additionality / transparency**	**Practicality**	**Acceptability**
B. Public finance from new sources						
Carbon levy on international transport	Carbon levy on international transport	Carbon levy on international transport	Carbon levy on international transport	Carbon levy on international transport	Carbon levy on international transport	Carbon levy on international transport
Share of carbon price revenue	Share of carbon price revenue	Share of carbon price revenue	Share of carbon price revenue	Share of carbon price revenue	Share of carbon price revenue	Share of carbon price revenue
Financial transaction tax	Financial transaction tax	Financial transaction tax	Financial transaction tax	Financial transaction tax	Financial transaction tax	Financial transaction tax

	Desirability				Feasibility	
	Efficiency	**Equity / incidence**	**Reliability**	**Additionality / transparency**	**Practicality**	**Acceptability**
C. Direct budget contributions						
Aid	Overall efficiency linked to that of tax system; does not itself help create a carbon price	International equity dependent on calculation of fair share; no incidence on poor countries (although non-additional finance could divert aid from some poor countries to others)	Subject to domestic revenue problem, fluctuations in GNI	Subject to definition of additionality relative to aid	Feasible using existing budget mechanisms; domestic and international guidelines for additionality and transparency required	Substantial increases beyond projected aid will be resisted by other domestic budget interests; potential concerns about double-counting
Other direct budget contributions, financed through reduced tax exemptions on fossil fuel use	Could bring significant co-benefits (economic efficiency, emissions reductions)	Incidence mostly on shareholders	Depends on approach to earmarking	Additional	Mostly straightforward changes in tax system	Resistance from affected businesses and industries

10 Attachments

Attachment A. Australia's share of the global commitment: assumptions and indicators

Total amount subject to fair share estimation

Some funding sources (particularly public sources) may be more readily attributable to individual countries than others (e.g. market-based and private capital flows, as well as international levies imposed on firms or individuals). It is likely therefore that if any burden-sharing measures are agreed internationally, they may only apply to a subset of the total global commitment (e.g. contributions from public funds to the Green Climate Fund). Nevertheless, given current uncertainties about the future mix of sources, it would be preferable to calculate countries' indicative fair shares on the basis of total financing needs (i.e. $100 billion in 2020) rather than whatever proportion of that total is expected to be taken up by public sources. Ensuring that all countries' indicative fair shares add up to the total commitment may increase individual countries' incentives to cooperate in the establishment of alternative sources that limit the pressure on their own public funding.[44]

Composition of group of contributing countries[45]

For the purposes of this report, and in line with UNFCCC terminology, developed countries are taken to comprise those in Annex II of the UNFCCC (i.e. parties that were members of the OECD in 1992). Developing countries are taken to be non-Annex I countries (i.e. those countries that are not included in Annex I of the UNFCCC; Annex I comprises Annex II or developed country parties plus 'Economies in Transition' [EITs], primarily consisting of countries that were part of the former Soviet Union).

For relevant indicators, we have chosen to use Annex I rather than Annex II as the relevant reference group. While only developed (Annex II) countries are required to contribute finance under the Cancun Agreements, a conservative scenario for the expansion of the group of contributors by 2020 would be that not only developed countries but also EITs form part of the contributing group. Most EITs are now members of the European Union, with notable exceptions such as the Russian Federation and Ukraine. Slovenia, an EU EIT member, has made a fast-start finance contribution. Per capita incomes of most EITs are higher than most non-Annex I countries (World Bank 2011c), and since Annex I countries already have mitigation commitments, it is conceivable that financing commitments could in future apply to Annex I countries.

Some developing (non-Annex I) countries (including Brazil and China) have indicated a willingness to provide climate finance to poorer developing countries (Brown et al. 2010:5). In addition, as a number of parties to the UNFCCC have argued, current country listings

[44] It is also possible in principle that commitments required from individual countries to the Green Climate Fund could be calibrated according to how much each country contributes in climate finance through other channels, so that countries' share of funding through all channels is comparable.

[45] See also Section 3.

according to Annexes are not reliably tied to objective criteria, particularly since a number of countries with relatively high emissions and income are not included in Annex I (von der Goltz 2009:11; Australia 2008:76). By 2020 it is likely that either further countries will have been added to the list of developed countries, or the method of listing countries will have been reformed to reflect more objective criteria. In general, it is likely to be in Australia's interest to advocate more objective criteria for defining groups of contributors, as this is likely to broaden the base of contributions in line with projected trends in economic growth and emissions (which will see today's developing countries increasing their share of both global GDP and emissions: Garnaut et al. 2009).

Burden shares from existing multilateral funds

As noted in Section 2, using burden-shares from existing multilateral funds may understate the individual shares required to meet a given commitment, since the sum of countries' basic burden-shares frequently adds up to less than 100 per cent of the required amount. For example, individual countries' basic shares of the IDA15 and GEF5 replenishments amounted to 80 and 73 per cent of the required replenishment amount. The gap is due to some donors reducing their shares over successive replenishments without corresponding increases by other donors (World Bank 2007:13). A process to automatically normalise shares so that they total 100 per cent is not yet in place, partly due to some donors' attachment to burden-sharing figures established in previous replenishments as well as concerns that adjustment would result in greater fluctuations in all donors' shares across successive replenishments.

Indicators

Category	Indicator	Reference group[46]	Source	Notes	Share (%)
Responsibility	Annual emissions (average 2006-08, GHGs excl LULUCF)	Annex I	UNFCCC 2010b	Estimates do not include emissions from international bunkers (maritime and aviation)	3.0%
	Annual emissions (average 2006-08, GHGs incl LULUCF)	Annex I	UNFCCC 2010b	As above	4.3%
	Cumulative emissions (1990-2008, GHGs excl LULUCF)	Annex I	UNFCCC 2010b	As above	2.7%
	Cumulative emissions (1990-2008, GHGs incl LULUCF)	Annex I	UNFCCC 2010b	As above	3.4%
Capacity	GDP 2007-09 (purchasing power parity [PPP], constant 2005 international $)	High-income countries	World Bank (World Development Indicators)	The World Bank classifies high-income countries as those having Gross National Income per capita of US$12,276 or more in 2010. This group is considerably broader than Annex I, comprising around 70 countries, although it does not include the Russian Federation, which (although a major Annex I emitter) is classed as an upper middle income country.	2.0%
	GDP 2007-09 (market exchange rates [MER], current US$)	High-income countries	World Bank (World Development Indicators)	As above.	2.2%
	UN Scale of Assessment 2011	Global	United Nations 2010	The Scale of Assessment is based primarily on the Gross National Income (GNI) of member states, calculated in most cases using market exchange rates. The scale is progressive and adjusted to reduce the burden of low-income countries. There is a floor (0.001%) and a ceiling (22%) on contributions. See United Nations 2006 and Barrett 2007:113-16).	1.9%
Existing pledge-based burden-sharing arrangements	Fast-start finance commitments	Contributors	Australian Government; Copenhagen Accord	A$599m of a US$30b commitment, calculated at exchange rates for the month in which the commitment was announced (June 2010; approximately A$1:US$0.85). At a 1:1 exchange rate, Australia's share would be 2.0%.	1.7%

[46] This table expresses indicators for Australia's share as a percentage of contributions from a 'reference group'.

	International Development Association – Fifteenth Replenishment (IDA 15 - 2008)	Contributors	World Bank 2008:62	We use Australia's share of the 'basic contribution' to the replenishment, rather than its share of the 'total contribution' (approximately 1.61%).[47] Countries generally use basic contributions as the primary indicator of their burden share (which would be used as the starting point for their share in future replenishments). The sum of all contributors' basic shares amounts to 79.80% of the total replenishment amount.[48]	1.8%
	Global Environment Facility - Fifth Replenishment (GEF 5 - 2010)	Contributors	GEF 2010:148	As per the IDA share, we use Australia's share of the basic contribution, rather than its share of total contributions (1.78%), which include supplemental contributions. The sum of all contributors' basic shares is equivalent to 72.74% of the total replenishment amount.[49]	1.5%
	Official Development Assistance (average 2008-10)	Contributors	OECD 2011a	Reference group is members of the OECD's Development Assistance Committee	2.6%
Group averages	Average of responsibility and capacity indicators [=high scenario]	Hybrid	As above	Average of (1. Average of responsibility indicators and 2. Average capacity indicators)[50]	2.7%
	Average all groups	Hybrid	As above	Average of (1. Average of responsibility indicators; 2. Average capacity indicators; 3. Average of pledge-based indicators)	2.4%
	Average pledge-based and voluntary shares	Contributors	As above	Average pledge-based and voluntary share indicators	1.9%

[47] The total contribution includes supplemental contributions, contributions for debt relief and clearance of arrears.

[48] If Australia's basic share for IDA 15 were scaled to a percentage of the sum of all contributors' basic shares, it would amount to 2.3%.

[49] If Australia's basic share for GEF 5 were scaled to a percentage of the sum of all contributors' basic shares, it would amount to 2.1%.

[50] We take this approach rather than using the average of all individual indicators in order to avoid distortions resulting from some groups having different numbers of indicators.

Attachment B. Carbon market finance

Three of the scenarios for Australia's carbon market finance (*Low*, *Default*, and *High*) are constructed by:

1. assuming a set of emissions prices;

2. assuming a resulting domestic level of emissions extrapolating from Treasury (2008) modelling;

3. combining the emissions levels with an assumed national emissions target to give the amount of permit purchases; and

4. multiplying by the assumed price to give revenue estimates.

The other scenario (*Strong Growth, Low Pollution* or *SGLP)* is based on the Treasury (2011) modelling, and assumes permit purchases based on Chart 5.2 of the modelling. The value of carbon market revenue for this scenario is within the range given by the other scenarios.

	Carbon price, $/tCO$_2$		
Scenario	2015	2020	Reference point
Low	12	14	Current CER future prices[51]
Default	25	35	Assumes an EU recovery
High	35	45	Rapid ramp-up, 2020 similar to Treasury (2008) modelling of –15% scenario
SGLP	27.9	32.6	Based on Treasury (2011) modelling (Chart 3.4)

The price for the *low* scenario is similar to current CER future prices. The price for the *default* scenario is similar to EUA (EU emission allowance under the EU Emissions Trading Scheme) future prices before the decline in EUA prices in mid-2011. The *high* scenario represents the situation where the carbon price is ramped up more rapidly between 2012 and 2020. At 2020, it is similar to that modelled by the Australian Treasury (2008) for the CPRS-15 scenario. The carbon price for the *SGLP* scenario is from Chart 3.4 of the Treasury (2011) modelling.

The Tables below show the volume and value of Australian emissions permits purchases when these price assumptions are combined with an Australian emissions target of –5, –15 or –25 per cent (and for 2015, targets that are on a linear trajectory from 2009 emissions levels to the respective 2020 target). Scenarios deemed implausible are marked by numbers that are greyed out and in italics.

[51] A higher carbon price is used for domestic revenue estimates, based on the assumption that Australia's price floor is in operation.

The estimates of volumes incorporate assumptions about Australia's domestic emissions reductions in response to the respective carbon price level. These are calibrated to the abatement responses in the Treasury (2008) MMRF modelling scenarios.

It is worth noting that carbon market financing does not necessarily increase with a stronger national emissions target, if a stronger target also means a higher domestic emissions price. In this case, the effect of a higher permit price is counteracted – or possibly fully outweighed – by lower trade volumes because more of the required overall emissions reductions are achieved domestically.

2020	National emissions target, relative to 2000	-5 per cent		-15 per cent		-25 per cent	
		Purchases of emissions entitlements					
	Price, $/tCO$_2$	Volume (Mt)	Value (A$bn)	Volume (Mt)	Value (A$bn)	Volume (Mt)	Value (A$bn)
Low	14	69	1.0	124	1.7	180	2.5
Medium	35	55	1.9	111	3.9	*167*	*5.8*
High	45	*-1*	*-0.03*	55	2.5	*111*	*5.0*
Additional *Strong Growth, Low Pollution* scenario							
SGLP	32.6	94 Mt at A$3.1 billion					

2015	National emissions target, relative to 2000	+2 per cent		-2 per cent		-6 per cent	
		Purchases of emissions entitlements					
	Price, $/tCO$_2$	Volume (Mt)	Value (A$bn)	Volume (Mt)	Value (A$bn)	Volume (Mt)	Value (A$bn)
Low	12	23	0.3	44	0.5	*64*	*0.8*
Medium	25	16	0.5	37	1.1	*57*	*1.7*
High	35	*-18*	*-0.6*	3	0.1	*23*	*0.8*
Additional *Strong Growth, Low Pollution* scenario							
SGLP	27.9	28 Mt at A$0.8 billion					

The volume of international permit trade depends on the level of Australian domestic emissions for a given carbon price. We make the following assumptions about how the level of domestic emissions will depend on the carbon price for the scenarios based on Treasury (2008) modelling:

Relationship Between Carbon Price and Domestic Emissions: Domestic emissions in covered sectors (Mt CO_2-e)	2015	2020
Low Scenario[52]	439	443
Default Scenario[53]	432	430
High Scenario[54]	398	374

[52] To estimate domestic emissions for the *low* scenario, we choose a point between the business as usual trajectory and the CPRS-5 trajectory from Chart 6.4 of the Treasury modelling. The location of the point is determined by the ratio of the *low* carbon price to the CPRS-5 carbon price. This assumption would be consistent with a linear marginal abatement cost curve.

[53] To estimate domestic emissions for the *default* scenario, we estimate domestic emissions by using the CPRS-5 Scenario from Chart 6.4 of the Treasury (2008) modelling, which assumes a similar carbon price.

[54] To estimate domestic emissions for the *high* scenario, we estimate domestic emissions by using the CPRS-15 Scenario from Chart 6.4 of the Treasury (2008) modelling, which assumes a similar carbon price.

Attachment C. Carbon pricing revenue

We have four carbon price scenarios: *low*, *default*, *high*, and *Strong Growth, Low Pollution (SGLP)*. Prices are in nominal Australian dollars and are as in the Tables below, consistent with the assumptions used for the carbon market estimates. The low price scenario is based on the assumption that the carbon price is determined by the 'price floor' in Australia's carbon pricing mechanism to be $15 in 2015. It is also assumed that in 2020 the price floor is still in operation, or a similar mechanism is in operation, so that the price is $20.

A description of the prices for each scenario is included in Attachment B.

Australia's emissions allocation in a particular year were obtained from Figure 1 of Australia's 2010 projections (Department of Climate Change and Energy Efficiency 2011). The amount of revenue raised from carbon pricing in a particular year depends on the amount of emissions covered by a carbon price. The amount of emissions covered in a particular year depends on which sectors are covered, and the total amount of emissions in each sector. Australia's projections from Department of Climate Change 2009 have an estimate of emissions from 'uncovered sectors' of 155 Mt CO_2-e in 2020 and 152 Mt CO_2-e in 2015. The SGLP scenario assumes that uncovered sectors include an extra 85 CO_2-e of transport emissions.

The assumptions used to calculate permit revenue for each scenario are the following:

Carbon Price Assumptions – *Low* Scenario		
	2015	**2020**
Carbon Price (nominal AUD)	$15	$20
Target (Mt CO_2-e)	568	530
Cap in Covered Sectors (Mt CO_2-e)	416	375
Carbon Price Revenue (billion AUD)	8.3	9.4
Carbon Price Assumptions – *Default Scenario*		
Carbon Price (nominal AUD)	$25	$35
Target (Mt CO_2-e)	547	474
Cap in Covered Sectors (Mt CO_2-e)	395	319
Carbon Price Revenue (billion AUD)	9.9	11.2
Carbon Price Assumptions – *High Scenario*		
Carbon Price (nominal AUD)	$35	$45
Target (Mt CO_2-e)	527	418
Cap in Covered Sectors (Mt CO_2-e)	375	263
Carbon Price Revenue (billion AUD)	13.1	11.8
Carbon Price Assumptions – *Strong Growth, Low Pollution* Scenario[55]		
Carbon Price (AUD)	$27.9	$32.6
Cap in Covered Sectors (Mt CO_2-e)	299	236
Carbon Price Revenue (billion AUD)	8.3	7.7

[55] Based on assuming carbon prices from Chart 3.4 of the Treasury (2011) modelling; and assuming caps based on the default pollution caps in the Clean Energy Bill and 2012-13 covered emissions of 337 Mt, which assumes an extra 85 Mt of uncovered transport emissions.

Attachment D. Carbon levy on international transport (bunker fuels)

Revenue

Australian international transport emissions are projected to rise from around 12 Mt CO_2 to around 15 Mt by 2020, with over three quarters from aviation, the rest from maritime transport.

Projected Australian international transport emissions ($MtCO_2$)	2008 (Department of Climate Change and Energy Efficiency 2010)	2015 (interpolation)	2020 (Sinclair Knight Merz MMA 2011)
Maritime	2.9	3.1	3.2
Aviation	9.3	10.9	12.0
Total	12.2	14.0	15.2

Assuming carbon prices as in Section 5 above ($14 to $45 at 2020), this provides total revenue estimates between $0.2 billion and $0.5 billion per year by 2020. Scenarios for how this might translate into available climate change finance are given in the main text.

Total revenue from carbon levy on international transport ($b per year)	**Default carbon price**		**High carbon price**		**Low carbon price**	
	2015	2020	2015	2020	2015	2020
Total	0.35	0.53	0.49	0.68	0.17	0.21
Aviation	0.27	0.38	0.38	0.49	0.13	0.15
Maritime transport	0.08	0.11	0.11	0.14	0.04	0.04

Economic impact and cost incidence

It is useful to compare the cost of an international transport levy with other industry costs, such as fuel costs; or economic outputs, including tourist passenger transport revenue, and the total value of traded goods.

Exports of goods in 2010	$231 billion
Imports of goods in 2010	$211 billion
Total traded goods in 2010 (imports plus exports)	$442 billion
Australian tourism GDP 2007-08	$40 billion
Australian tourism Gross Value Added 2007-08	$31 billion
Long distance tourist passenger transportation revenue 2009-10	$14 billion
International Sea freight to and from Australia - (BITRE)	733.7 Mt

Sources: Australian Bureau of Statistics, Bureau of Infrastructure Transport and Regional Economics 2009).

We estimate fuel costs from emissions in 2008 and the IPCC Guidelines for National Greenhouse Gas Inventories. We use 2011 prices for bunker fuels and adjust future prices according to inflation and assume a 4 per cent real increase.

Year	2015	2020
Aviation fuel costs (billion AUD)	3.3	4.8
Maritime fuel costs (billion AUD)	0.7	0.9

This gives the following outcomes for each scenario:

	Default carbon price		High carbon price		Low carbon price	
	2015	2020	2015	2020	2015	2020
Aviation emission revenue as fraction of fuel costs	8%	8%	12%	10%	4%	3%
Aviation emission revenue as fraction of projected incoming passenger revenue[56]	0.6%	0.7%	0.9%	0.9%	0.3%	0.3%
Aviation emission revenue as fraction of projected gross value added[57]	3.7%	4.6%	5.2%	6.0%	1.8%	1.9%
Maritime emissions revenue as fraction of fuel costs	9%	9%	12%	11%	4%	4%
Maritime emissions revenue as fraction of the value of total traded goods[58]	0.02%	0.02%	0.02%	0.03%	0.01%	0.01%
Maritime emissions revenue per tonne of goods projected to be shipped[59]	$0.09	$0.12	$0.13	$0.15	$0.04	$0.05

[56] We use estimates of long distance tourist passenger transport revenue for 2007-08 from the ABS Tourism Satellite Account; we use international annual passenger-kilometre projections from Sinclair Knight Merz MMA (2011) to project the increase in tourism passenger transportation revenue from 2008 to 2015 and 2020; we use incoming and outgoing passenger statistics from 2007-08 to estimate the portion of flights from incoming tourists.

[57] We use estimate an estimate of gross value added from aviation for 2007-08 of $6.427 billion from BITRE (2009); we estimate the portion of gross value added from international transport, and projections of gross value added for 2015 and 2020 using passenger-kilometre projections from Sinclair Knight Merz MMA (2011).

[58] We assume total traded goods to be the 2010 level of $442 billion. Actual total traded goods values in 2015 and 2020 are likely to be greater, which will result in maritime emissions revenue being a smaller fraction of total traded goods.

[59] We use Sinclair Knight Merz MMA (2011) projections of international shipped tonnes.

The following observations can be made:

- Emission revenue is approximately an order of magnitude less than fuel costs for both aviation and maritime sectors, which is significant, but will have a much smaller impact than recent fluctuations in fuel prices.[60] We estimate that a carbon levy of $45/t would increase the price of a return Sydney-London airline ticket by $180,[61] if all costs were passed on to passengers.
- Aviation emission revenue as assumed here would amount to between 0.3 per cent and 0.9 per cent of international tourist passenger revenue. Some of the cost from aviation emission revenue is likely to be passed on to passengers. The price elasticity of demand for long-haul international leisure is estimated between -0.6 and -1.7 (Hepburn and Müller 2010), so the unmitigated percentage impact on tourist passenger numbers might be similar order of magnitude as the percentage price impact. However, two factors would reduce the impact on tourist numbers:
    1. Some prices would be passed on to non-tourist passengers, who are much less price sensitive (price elasticity of demand estimated at around -0.3 per cent, Hepburn and Müller 2010). The impact of emission pricing on fuel costs is likely to be passed on to business-class flights significantly more than economy-class flights.
    2. An emissions levy could reduce 'guilt' about emissions from international travel, and Australia could promote itself as a 'green' destination.
- The impact on tourist numbers is likely to be small, perhaps in the order of 1 per cent without any mitigating measures. If some of the money raised is used to assist industry, then this could further reduce the impact or even fully offset it.
- The maritime emission revenue is extremely low compared to total traded goods, and the revenue per tonne of goods shipped is also extremely low.

Desirability

A levy on international transport emissions is a new source of public finance, so it is clear that the finance raised will new and additional. Overall, amount of revenue raised will be highly predictable, once bunker fuel levies are in place.

A levy could face resistance from airline and shipping industries. There would be additional costs faced by exporters and importers, but our analysis suggests that this would be low. Allocating part of the revenue collected from customers back to the transport industries (and their main connected industries) to help them improve their practices could fully compensate negative impacts.

If a carbon levy is applied to international transport from and/or to Australia but not other countries, there will be concerns about diversion of traffic to other countries, which is

[60] Since the beginning of 2008, WTI Crude prices have risen to approximately US$145, declined to just over US$30, then returned to levels of over US$100 in early 2011.

[61] Based on such a flight resulting in 3.97 tonnes of emissions.

economically inefficient. However, this is unlikely to be of significant practical concern for Australia.

Firstly, Australia is not a major transport hub, with most cargo and passenger traffic originating from or destined to Australia. A study commissioned by the International Maritime Organisation Vivid Economics 2010 finds that Australia sees relatively little impact on iron ore freight costs due to its proximity to China and its large, low cost firms. Secondly, the impost of a transport levy relative to the value of traded goods is very low. The most salient impacts might be expected on the growth of air passenger traffic, where there are opportunities to forego travel, or (in particular for leisure travellers) to choose different destinations where travel costs are cheaper. However, the additional costs are not large relative to the total cost of a typical overseas trip.

A final consideration is distortions between international and domestic transport. If and when Australia introduces domestic carbon pricing that covers the transport sector, the efficient solution in that context would be to levy the same carbon penalty on international transport, in order to avoid inefficient favouring of international relative to domestic transport.

Any adverse impacts on the transport industry's profitability could be readily compensated by allocating a share of the revenue to mitigation measures. Any adverse impacts on the tourist industry could also be readily compensated, for example by increased government spending on tourism infrastructure.

Internationally, there is the question of impacts on some aviation and maritime 'hubs', such as some small island states. This issue was raised by some developing countries in the meeting of the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA) at Cancún in 2010. The AGF report noted "these instruments may present difficulties, however, in terms of political acceptability and incidence on developing countries." This question is an issue for international harmonisation and coordination of transport emissions – but is not so relevant to the question of Australia addressing its international transport emissions before such coordination occurs.

The costs of the carbon levy would ultimately be borne by airline passengers, and by businesses that ship or receive goods through international transport. The overall cost incidence would thus be shared between Australian and overseas citizens and businesses.

The International Civil Aviation Organisation (ICAO) made submissions to the UNFCCC (FCCC/SBSTA/2010/MISC.14 2010) in the lead-up to the COP16 climate conference, responding to the AGF report and describing a resolution passed by the ICAO Assembly on climate change. They state in response to the AGF report that the "international aviation sector should not be singled out as a source of revenues". Their Assembly resolution has guidelines for market-based-measures including that:

> "where revenues are generated from MBMs [market based mechanisms], it is strongly recommended that they should be applied in the first instance to mitigating the environmental impact of aircraft engine emissions, including mitigation and adaptation, as well as assistance to and support for developing States".

Feasibility

A carbon levy on Australia's international aviation could be implemented in a very simple manner through a levy on jet fuel. Planes generally arrive in Australia with empty tanks and

need to fill up to reach their next destination, so there is little scope for evading the carbon levy even if Australia were to implement the levy unilaterally to start with.

The levy would apply irrespective of nationality of carriers, destination or origin of flights. It would thus be much simpler than the proposed EU system.

The levy could be charged at the same rate per tonne of CO_2 as Australia's domestic carbon price, or at an internationally agreed rate. Under Australia's proposed carbon pricing mechanism, some other fuels will also have their price increased by reducing fuel tax credits using a 'fee' linked to the carbon price. The level of this fee is based on auction clearing prices and is updated every 6 months.

For shipping, the situation is less straightforward. Ships can generally bunker much more fuel than required for one journey, and already tend to avoid bunkering in Australia as fuel oil prices are higher than in many other ports. Thus, carbon levies would need to be raised depending on origin and/or destination of cargo.

This may still allow unilateral implementation, especially seeing that the additional cost would be miniscule relative to the value of goods, so trade diversion appears unlikely.

Article 24 of the *Convention on International Civil Aviation* (Chicago Convention) states that 'Fuel, lubricating oils, spare parts, regular equipment and aircraft stores on board an aircraft of a contracting State, on arrival in the territory of another contracting State and retained on board on leaving the territory of that State shall be exempt from customs duty, inspection fees or similar national or local duties and charges.' So if a country (such as Australia) were to unilaterally impose a carbon price on fuel used by aircraft, the legality of doing so could be challenged. Amending the Convention would require a two-thirds majority in the Assembly of 'contracting States'. However, the EU plans to cover all domestic and international flights in its ETS from 2012, which would establish a precedent. Another approach would be to introduce an emission charge on a mutually agreed basis (Macintosh 2008).

There are two scenarios for how a transport levy could be introduced in Australia: it could be introduced as part of a harmonised international arrangement; or Australia could do it unilaterally, or in cooperation with a limited number of other states (such as the EU). The first approach is more desirable, but there are geopolitical difficulties that would have to be overcome, which may take some time. In particular, at the international level, the roles of the ICAO, IMO and UNFCCC are unresolved.

Attachment E: Financial transaction tax

Revenue

Global revenue. The AGF's estimates of global revenue potential from a CTT cover a wide range (US$2-$27 billion a year). The range is due a combination of wide variations in key parameters, including the tax rate, the associated effects on the volume of transactions, and the share of total revenue that is allocated to climate change rather than other policy objectives (AGF 2010c:62-63). Our initial analysis uses the following parameters from the AGF report:

- Total annual pre-tax trading volume: US$756 trillion[62]
- Tax rate: 0.001 to 0.01 per cent
- Elasticity of trading volume in response to changes in transaction costs: -0.5 to -1 (corresponding to a reduction in volume of 3-6 per cent for the 0.001 per cent rate, and 21-37 per cent for the 0.01 per cent rate)
- Share of total revenue returned to developing countries on whom tax is levied: 8.5 per cent[63]
- Percentage of total revenue allocated to climate change: 25 to 50 per cent (AGF 2010c:62-63).

Revenue from Australia. There are a number of limitations on the ability to derive country-specific estimates. First, estimates could be different depending on whether the tax applies to (i) all currency transactions that take place through a country's exchange, or (ii) all currency transactions involving the currency of that country.[64] As it happens, Australia's share of the global total is currently about the same under both measures (approximately 4 per cent: BIS 2010:19), but the relationship does not necessarily hold. Second, attribution to Australia of revenues from international transactions may be complex, since it could be argued that revenues should be attributed to the country of origin of the purchaser rather than the country hosting the trading platform (compare AGF 2010b:6). Third, existing country-specific figures are generally premised on full participation of other major financial centres. If only Australia were to participate, the revenue it would obtain is likely to be

[62] This is based on a daily volume of US$3,000 billion through the primary international currency settlement system (Continuous Linked Settlement, or CLS), and 255 trading days (AGF 2010c:62). The total revenue base may increase as the global volume of transactions through all systems increases (it was around US$4,000 billion a day in 2010: BIS 2010), and the share of global currency transactions that are settled through CLS rises (Leading Group on Innovative Financing for Development 2010:22).

[63] Note that this figure does not refer to the overall proportion of the tax revenue that goes to developing countries (rather than being retained by developed countries), but is instead a reimbursement to developing countries on whose financial centres or traders the tax has been applied, on the basis that only developed countries should be required to contribute funds.

[64] In principle it may be possible to tax offshore transactions in Australian dollars either via a centralised settlement system or at the point at which the transaction is cleared through the Reserve Bank of Australia.

significantly lower due to firms circumventing the tax or choosing other methods of addressing financial risk.

Noting these caveats, we use the figure of 4 per cent to the AGF's global total to arrive at a rough figure for the revenue that could be generated for Australia in circumstances where other major financial centres also impose such a tax.

Since the AGF's estimates are based on the application of the tax to the current volume of global financial transactions, it is not possible to interpolate a global figure for 2015. To differentiate volumes for Australia in 2015 and 2020, we introduce the assumption that the total volume of Australian currency transactions may grow during this period.[65]

For the purposes of developing low, medium and high scenarios we use the following assumptions:

	Tax rate	**Elasticity of volume in response to tax**	**% of revenue earmarked for climate finance**
Low	0.001%	High	25
Medium	0.01%	High	25
High	0.01%	Low	50

Revenue estimates are as follows:

			2015 (A$bn)	**2020 (A$bn)**
Global (AGF)	Constant global forex market	Low	-	2
		Medium	-	11
		High	-	27
Australia	Constant global forex market	Low	-	0.06
		Medium	-	0.42
		High	-	1.05
	Growing global forex market[66]	Low	0.08	0.10
		Medium	0.54	0.65
		High	1.35	1.64

[65] The global foreign exchange market has grown considerably in recent years, in some cases much more quickly than global GDP (growing 72% between 2004 and 2007 and 20% between 2007 and 2010) (BIS 2010:7).

[66] Estimates from this group are reported in the summary graphs and tables in the main text.

Desirability

The scope for avoidance would depend on how revenue collection arrangements were structured. On the one hand, if the tax were levied through the CLS on the currencies of countries that agreed to levy the tax, traders would have to weigh up the disincentives of trading outside a centralised system (Brondolo 2011:37).[67] On the other hand, if the tax were levied on transactions taking place in a particular territory or exchange, some traders may be able to redirect transactions through non-compliant financial centres (compare Hanke et al. 2010). Scope for avoidance of securities transaction taxes by switching to alternative financial instruments could be limited if the breadth of instruments covered was sufficiently broad. Distortionary effects of an FTT on financial markets could be limited as long as the tax rate remains low (AGF 2010b:7).

The reliability of an FTT would depend on a number of factors, including the range of financial instruments covered, and the influence of the tax on the volatility of the instruments. Predictions vary as to whether a CTT would decrease or increase volatility (Matheson 2011:22). The AGF report cites both the risk of a tax reducing liquidity and the potential benefits of reducing high-frequency trading, but does not suggest that the risk outweighs the benefits (AGF 2010b:7). Nationally collected FTTs could still be subject to the domestic revenue problem (Leading Group on Innovative Financing for Development 2010:21) as compared with an internationally coordinated FTT.

The extent to which the burden of an FTT would be borne by financial institutions rather than consumers is unclear, but the EU has estimated that its proposal would have an impact on GDP of around 0.5 per cent (European Commission 2011c:5).

Feasibility

The main constraint to acceptability would seem to be the resistance of major financial centres concerned about potential economic impacts of such a tax. This suggests that the only politically acceptable options for implementing an FTT would be either (i) a coordinated arrangement (e.g. through CLS) that only applies to a limited range of currencies of countries that have agreed to the arrangement, or (ii) a patchwork of nationally collected FTTs.

The AGF work stream paper suggests that the justification for using an FTT to raise funds specifically for climate change seems limited, unless one sees both as being 'by-product[s] of globalization' (AGF 2010b:1). A committee of experts commissioned by the Leading Group on Innovative Financing for Development has argued, 'The financial sector is uniquely placed as a channel to redistribute some of the wealth of globalisation towards the provision of global public goods' (Leading Group on Innovative Financing for Development 2010:4). Advocates for an FTT have also argued that revenues should be used for other purposes such as reducing global poverty or stabilising the international financial system, so it may be difficult to assume that the FTT could exclusively be used for climate purposes, but this is already built into the AGF's revenue assumptions.

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[67] Under a system of national collection, transactions of a given currency could be taxed at the point at which they are cleared through the Central Bank associated with that currency, whether or not the transaction was settled through a centralised system (compare Brondolo 2011:36).

Attachment F - Reduced tax exemptions for fossil fuel activities

There has been some previous research into fossil fuel subsidies into Australia:

- The OECD has generated an inventory of budgetary support and tax expenditure for fossil fuels, which includes Australia (OECD, 2011). Most of the budgetary support for fossil fuels, identified in this study, was for petroleum.
- Riedy (2007) estimates that subsidies for fossil fuels in 2005-06 were between $9 billion and $9.8 billion.
- Denniss and Macintosh (2011) identified $9-10 billion per year in subsidies for fossil each year between 2010 and 2014.
- A study in early 2011 (ACF 2011) estimates that if the Government did not end indexation of fuel excise in 2001, then revenue in 2010-11 would be $3.235 billion higher.

Tax expenditures

Most Australian fossil fuel related subsidies or tax exemptions can be thought of as being in two groups. The first is related to taxation of fuel used in non-road applications. The second group of subsidies includes assorted expenditures such as concessional treatment of the North-West shelf, state-based subsidies for the aluminium industry, and concessional treatment of company cars.

In interpreting fuel tax exemptions as subsidies, there are three broad approaches: Denniss and Macintosh (2011) directly treat it as a subsidy; Riedy (2007) looks at how much is collected compared to how much is spent on roads, and treats the difference - the 'road user deficit' - as a subsidy; while Henry (2010) considers externalities such as congestion and the lack of pricing to internalize them.

Because removing a particular expenditure can lead to behavioural changes, the amount of revenue from removing a particular expenditure will in many cases not be exactly the same as the level of that expenditure. However, it is likely to be a good approximation. Also, some expenditures (such as accelerated depreciation for certain fossil-fuel intensive assets) work by deferring taxation payments. The overall fiscal impact, in present value terms, of removing such an expenditure, is likely to be different to the nominal cash impact in a particular year or over the forward estimates.

The Australian Tax Expenditures Statement (Australian Government 2011c) lists details of officially accounted tax expenditures. More recent figures for tax expenditures in 2010-11 are in the 2011 budget papers.[68] Fuel taxation in Australia, and related tax expenditures, is described below:

- There is an excise of $0.38143 per litre on fuel used in internal combustion engines that are used on roads. This is lower than that of most OECD countries (OECD 2011c, Figure 1.2). The fuel excise stopped being indexed in 2001, and so in

[68] Statement 5, page 5-56.

decreasing in real terms. Transport fuels will be excluded from the carbon pricing mechanism.

- Fuel tax credits are provided for fuel used for off-road activities such as mining, and for heavy on-road vehicles – in the case of off-road activities such as mining, the fuel tax credits fully offset the fuel excise; in the case of heavy on-road vehicles, there is a 'road user charge', which is implemented through a fuel tax credit reduction and set in a Ministerial Determination that is presently at a level of $0.231 per litre. The road user charge raised $1.44 billion in 2010-11 (National Transport Commission 2011). It is therefore estimated that every one cent increase in the road user charge will increase revenue by $64 million per year (based on a road user charge in 2010-11 of $0.226 per litre); and that increasing the road user charge to same level as the fuel excise will raise $990 million per year.
- Under the carbon pricing mechanism, there will be a reduction in fuel tax credits for off-road purposes that will be linked to the carbon price. This reduction is projected to raise $570 million in 2012-13.
- Aviation fuel used for domestic purposes is only taxed at 3.5 cents per litre. The expenditure from charging this concessional rate of excise is projected to be $1.05 billion in 2010-11, and rise to $1.15 billion in 2013-14 (Australian Government 2011b).
- There is an exemption from excise for gaseous "alternative fuels" such as LPG, LNG, and CNG. This exemption is projected to cost $550 million in 2010-11, and $370 million in 2013-14 (Australian Government 2011b).

Australia also has tax exemptions related to resource extraction, including the extraction of fossil fuels:

- The North West Shelf was discovered before 1975, but condensate from the North West Shelf is taxed at 30 per cent – the benchmark for fields discovered after 1975, instead of 55 per cent – the benchmark for fields discovered before 1975.
- There is an 'exploration and prospecting' tax deduction, with a fiscal cost of $150 million in 2010-11, increasing to $200 million by 2013-14.

Other tax expenditures include:

- Some assets are treated with 'statutory caps' that shorten their write-off period. These assets include aircraft, 'certain assets used in the oil and gas industries', trucks, truck trailers, buses, light commercial vehicles, tractors and harvesters. Having an artificially shortened write-off period will reduce the cost of an asset compared to others, distorting decision making. This expenditure cost $915 million in 2010-11, and is projected to cost $1.15 billion in 2013-14.
    - A study by the Australian Conservation Foundation (ACF 2011) into this expenditure points out that approximately $340 billion in oil and gas investments is planned for the period 2012-18, and estimate that the annual nominal cost of this expenditure will be between $1.65 and $2.05 billion annually by 2018. The ACF study also estimates that by 2018, around $950 million of the benefits will flow to 6 companies: Woodside, Chevron, Shell,

ExxonMobil, Apache and Petrochina – with Woodside receiving an annual tax benefit of $320 million by 2018.

- The concessional fringe benefits tax treatment of company cars refers to a 'statutory formula' for valuing car fringe benefits that declines as the distance travelled each year increases. This formula previously led to a perverse incentive to drive more. In the 2011 budget, the statutory formula was changed to address this issue, at the same time reducing the level of this expenditure over the forward estimates by $953 million. In 2010-11 this expenditure had a fiscal cost of $1.11 billion.

Subsidisation of road transport

According to Riedy (2007:vi), the largest identified subsidy in Australia 'results from the failure of governments to capture sufficient revenue from the road network to cover the cost of maintaining the network and to achieve an appropriate rate of return'. Riedy argues that this 'road user deficit' is a subsidy and estimates that in 2005-06 it was $4.7 billion. This subsidy would not be additive with some of the subsidies counted by Denniss and Macintosh 2011. This 'road user deficit' is of a similar magnitude to what carbon pricing revenue might be – we estimate for the *default* scenario that if the carbon price covered all transport emissions, it would raise $4.78 billion from transport in 2020 (in nominal 2020 dollars). However, the carbon pricing mechanism proposed for Australia will not cover transport for households and light on-road commercial vehicles.

Henry contradicts the claim that there is a 'road user deficit' and finds that "the existing structure of fuel tax, annual registration and other road-related taxes is designed primarily to raise revenue. These taxes more than cover the direct costs of providing road infrastructure, but are not capable of providing specific prices that vary according to location or time of use." (Henry 2010, Part Two, p.376)

Riedy (2007) estimates much higher road authority expenditure than Henry (2010) because Riedy includes $11.9 billion based on the value of the land allocated to the road network.

Regardless of whether the difference between the total cost of providing and maintaining the road network and the revenue collected from road users is a subsidy, there is a case for altering the way that revenue is collected from road users. Congestion charging could become a new source of revenue. Henry (2010) states:

> There are large challenges facing transport in Australia. In particular, under 'business as usual' assumptions, the avoidable costs of urban congestion may grow to around $20 billion in 2020. This cannot be reduced simply by building more city infrastructure, as most new road space induces new traffic. Helping to manage road use, through efficient prices, provides the best long-term approach to reducing congestion. (Henry 2010, Part One, p.53)

State Government subsidies

Some subsidies in Australia are implemented by state governments. One such subsidy is cheap electricity for aluminium smelters. Turton 2002 estimates that aluminium smelters pay on average $21 per megawatt-hour (MWh) of electricity and that the annual subsidy to the industry is $210 million per annum, and probably in excess of $250 million. Riedy (2007) also found that in Queensland and NSW, electricity generators paid reduced prices for their coal, and this subsidy was worth between $0.45 billion and $1.1 billion in 2005-06. Recent media reports suggest that similar subsidies are associated with the electricity privatisation in NSW.

The OECD inventory (OECD 2011c) identified a number of state-based expenditures that support fossil fuel. These include support for coal industry development in Western Australia; financial assistance for North West Shelf Gas in Western Australia; a Western Australia diesel subsidy; the now-defunct Queensland fuel subsidy scheme; and the reticulated natural gas rebate in Queensland.

Attachment G - Financing through the aid budget

Revenue

In Section 8 we model the following scenarios, which vary according to the extent of reliance on the aid budget, assumptions about the trajectory for total aid, and the definition of additionality used:

Scenario	Aid allocated to climate finance	Total aid	Strength of definition of additionality for aid-based climate finance
1. Low	Aid allocated to climate finance remains at absolute level of fast-start commitment at 2012-13[69] – all other public funds sourced outside aid budget	(not relevant)	Medium
2. Medium	Aid allocated to climate finance remains same share of total ODA as last year of Australia's current climate finance pledge (2014-15), projected to be 4.3%[70]	Total aid rises to 0.5% of GNI by 2015-16, then remains at that share	Medium
3. High	Aid allocated to climate finance accounts for a maximum of 5% of ODA	Total aid rises to 0.5% of GNI by 2015-16, then to 0.7% of GNI by 2020-21[71]	Medium-weak (5% cap) / weak (10% cap)

[69] 2012–13 is the last year for which Australia has made a specific international commitment of climate finance under the UNFCCC and declared specifically that the funds would be sourced from the aid budget. Indicative year-by-year allocations during the fast-start period are derived from Australian Government budget papers. Australia's fast-start commitment commenced in the final month of the financial year 2009–2010, but in order to maintain a rough split of the fast-start commitment across three financial years (rather than four), we count the June 2010 component ($15 million) towards the 2010–11 total.

[70] The estimated share of total ODA is based on a projected year-by-year split of Australia's total pledge (A$1.2 billion from 2010–11 to 2014–15). Although Australia has not set out specific annual allocations for the $1.2 billion pledge, it can be inferred that funding from 2013–14 to 2014–15 would be the remainder of the $599 million fast-start commitment (i.e. roughly $601 million). We assume that this amount is split between the two years not in equal amounts, but proportionate to the overall size of the aid budget in each year. Therefore, in our projections climate finance would be 4.3% of total ODA in both 2013–14 and 2014–15.

[71] For this scenario we assume that the ODI/GNI ratio rises at a constant rate (0.04% per year) between 2015–16 and 2020–21. This would be a roughly similar annual increase in ratio as the preceding three years.

Results for each scenario are presented in the table below:

	2015		2020	
	A$bn	% of total aid	A$bn	% of total aid
1. Low	0.21	2.5%	0.21	2.0%
2. Medium	0.37	4.3%	0.47	4.3%
3. High	0.42	5.0%	0.76	5.0%

Desirability

Additionality – key considerations. Broader policy issues relating to additionality are outlined in the main text. Here we consider in more detail a range of possible principles for establishing a definition of additionality, as well as several specific options for additionality, the most plausible of which are compared in the scenarios introduced above. Given highly divergent perceptions of what additionality requires, reaching a balanced but principled definition will be challenging, but some key issues can be clarified.

First, when determining a 'baseline' for additionality, the essential idea is defining 'business as usual', defined not merely in terms of what has already happened (or not happened), but also what would have happened in a specified future period were it not for the proposed funding (compare e.g. Dutschke and Michaelowa 2006).[72]

Second, the complementarities between climate and development objectives are certainly significant (see UNDP 2007, World Bank 2009), and a major role for aid programs will be to ensure that their activities across all sectors take account of climate risks and minimise harmful impacts on the climate. However, financial needs analyses generally estimate climate finance needs as those that are additional to development needs (Ecofys 2011), and although climate-proofing existing aid activities may involve extra costs, this is not necessarily the case – the key requirement may be to do things differently. For these reasons, the complementarities between climate and development objectives alone would only seem to justify at most a small proportion of aid being allocated to climate finance.

Third, any approach will also need to take into account that the most politically acceptable international outcome will likely involve (a) placing reasonable limitations on developed countries' reliance on aid for meeting climate finance commitments, while (b) acknowledging that the use of aid for fast-start finance commitments (and the complexities involved in establishing other sources) will make it difficult to effect an immediate transition to a climate finance commitment that is not reliant on a portion of aid.

[72] Although it could be argued that the relevant comparison is whether or not a given climate-related activity would have happened in the absence of developed country funding (regardless of whether it was funded from the aid budget or not), it seems more appropriate to frame the comparison whether or not the given amount of funding would have provided a benefit to developing countries.

Additional to 0.7 per cent of GNI. Developing countries have argued that climate finance should be additional to the UN aid target of 0.7 per cent of developed countries' GNI. Although the Labor Party and the Greens have pledged to reach this target in the longer term (Smith 2010), this standard is not likely to be adopted by other countries, particularly since many donors are a considerable way from reaching this target (notably the US).

Additional to existing climate finance or existing aid. At the other end of the spectrum are broader definitions based on a comparison with existing climate finance or existing aid (see Brown et al. 2010:3; Australia has opted for the latter approach). A simple comparison between existing and projected climate finance is likely to be inadequate, since the 'additional' longer-term climate finance could still involve diversion of aid funds. A slightly more substantial definition is the idea that climate finance should be additional to existing aid. However, it is still possible that climate funds could be sourced by diverting *projected* aid, e.g. sourcing climate finance from commitments to raise aid funding to a higher ODA/GNI ratio (although developed countries could argue that such pledges are made without prejudice to the range of specific purposes that they could eventually be allocated).

Additional to projected aid. A more rigorous but still potentially plausible interpretation of additionality is that climate finance will be considered additional if it is in addition to projected aid. This avoids the potential diversion of future development assistance flows from aid targets that have been set prior to making climate finance commitments, and seems closest to the idea of additionality used in the CDM. However, it is still potentially subject to donors 'gaming' the system by downgrading their future aid pledges in order to accommodate more climate funding (Stadelmann et al. 2010). This risk could be mitigated by assuming a uniform minimum scenario for projections across countries (as recommended by Stadelmann et al. 2010), but may be difficult to agree upon internationally.

Variants of approaches based on projected aid. A variant of this approach is to stipulate that climate finance should in general be additional to projected aid, but that a certain proportion of the aid budget could still be counted towards total climate finance. This takes account of the idea that there may be some overlap between climate and development goals, while recognising the importance of a meaningful commitment to additionality.

The scenarios above each represent variants of the maximum amount of projected aid that could be included in a climate finance commitment. The *low scenario* sets a cap by reference to the dollar amount of Australia's fast-start commitment, while the *medium scenario* uses the proportion of the aid budget devoted to climate finance in the final year of Australia's current pledge (2014-15). The cap in the *high scenario* is not explicitly linked to existing or projected levels of climate finance, but to a rounded percentage of the aid budget. If international guidelines on additionality are agreed that include some version of a cap, it is possible that a uniform percentage of aid budgets would be adopted, rather than a cap based on individual countries' existing or projected climate finance commitments.[73] In 2009, the UK proposed that a maximum of 10 per cent of its aid budget could be allocated to meet climate finance commitments (Brown 2009). As indicated in Figure 6, a cap at this level would permit a country such as Australia to meet around half of its total climate finance

[73] Variable caps based on past trends could be to the advantage of countries that had drawn most heavily on their aid budgets to meet existing commitments.

commitment (or all of its projected contribution from public funds) from aid in 2020-21.[74] Reliance on the aid budget to such an extent to meet longer-term commitments would seem to run contrary to the principle of additionality, and for this reason we have modelled a 5 per cent scenario instead.

Additionality and ODA-eligibility of other sources. The OECD's definition of ODA requires that funding be 'administered with the promotion of the economic development and welfare of developing countries as its main Objective' (OECD 2008). Countries contributing climate finance have construed this broadly, and until now most have considered their climate finance contributions to fall within this definition. Since funding from both aid budgets and innovative public sources is likely to fall within the OECD's broad definition of Official Development Assistance (ODA), it is possible in principle that countries could seek to count funding from new sources towards their commitment to contribute a certain percentage of GNI towards ODA, thus displacing funding from the general aid budget. We assume that even if funding from new sources were ODA-eligible, it would be counted separately from funding earmarked to meet existing ODA commitments (such as the UN target of 0.7 per cent of GNI).

Feasibility

As direct budget contributions do not require the establishment of new institutions or agreements, they could continue to be a valuable channel for funding while other instruments are being established (AGF 2010c:13). The use of direct budgetary contributions would be strongly supported by developing countries, who have argued for climate finance to be sourced exclusively or primarily through this channel.

[74] Using slightly different assumptions, the Garnaut Review update has estimated that Australia's commitment in 2015–16 could amount to 9 per cent of total aid (Garnaut 2011:11).

11 Glossary

AGF	UN High-Level Advisory Group on Climate Change Financing
AWG LCA	Ad Hoc Working Group on Long-Term Cooperative Action under the Convention
CDM	Clean Development Mechanism
CERs	Certified Emissions Reductions (issued under CDM)
CO_2-e	Carbon dioxide equivalent
COP	Conference of the Parties (to the UNFCCC)
CTT	Currency Transaction Tax
ETS	Emissions Trading Scheme
FTT	Financial Transaction Tax
GHG	Greenhouse gas
GNI	Gross National Income
Gt	Gigatonne(s) (billion metric tonnes)
LULUCF	Land use, land use change and forestry
Mt	Megatonne(s) (million metric tonnes)
NAMA	Nationally Appropriate Mitigation Action
ODA	Official Development Assistance
PPP	Purchasing power parity
REDD(+)	Reducing emissions from deforestation and forest degradation in developing countries; (and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries)
t	Tonne(s) (metric)
UNFCCC	United Nations Framework Convention on Climate Change

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