

CLIMATE FINANCE

A tool-kit for assessing climate
mitigation and **adaptation**
funding mechanisms

A report by Dr Stephen Spratt of the
Institute of Development Studies (IDS) and
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Executive summary

This report supersedes *Assessing the Alternatives: Financing climate change mitigation and adaptation in developing countries* (Stephen Spratt, 2009), which established a methodology for assessing and comparing various potential funding mechanisms. The aim of this paper is to apply this analysis to today's situation, helping us to better understand the changing landscape of climate finance and suggest a portfolio of mechanisms which would move us closer to the level of financing required to meet mitigation and adaptation costs in developing countries.

The global climate is changing, fast. This is the direct result of human activity. It is broadly accepted that we need to restrict global temperature increases to as far below 2°C as possible if we are to avoid triggering runaway, irreversible and catastrophic climate change. This means urgently decarbonising our global economy.

Whatever else happens, we will need to adapt to the climate change that is already 'in the system'. Moreover, the tragic fact is that those who stand to lose most through the effects of climate change have little or no responsibility for creating it: it is the cumulative impact of industrial activity in the developed world that has largely created this problem, and it is these developed countries, therefore, that need to shoulder the burden of dealing with it.

The need to rapidly and urgently reduce CO₂ emissions also means that, particularly for larger developing economies, fossil-fuelled development is not a viable long-term option. To ensure that their development is genuinely sustainable, countries need to embark upon a low-carbon path. Unlike their developed country counterparts, who grew their economies generating energy at low cost and without particular environmental consideration, the responsible trajectory now asked of developing countries will require significantly greater investment, and potentially higher energy costs. As with adaptation, there is therefore a degree of moral obligation for developed countries to finance this process, since it is their previous actions that have made it a necessity. As well as this obligation, there is practical necessity. Developing countries simply do not have the capacity to address poverty and human development while simultaneously adapting to and mitigating climate change.

In this paper we consider briefly the framework required for mitigation, looking at both a global cap on emissions and a carbon tax. We then examine the merits of nine proposals for how mitigation and adaptation in developing countries could be financed:

- 1 **China + G-77** – direct budget contribution of between 0.5% and 1% GDP of developed countries.
- 2 **General Carbon Tax** – applying a levy of \$1 per ton of CO₂ emissions in all developed countries.
- 3 **Taxing carbon emissions from shipping** – a \$25 price per ton of CO₂ emitted from the international maritime sector.
- 4 **Taxing carbon emissions from aviation** – a \$25 price per ton of CO₂ emitted from international air travel.
- 5 **Financial Transaction Tax (FTT)** – with particular focus on the taxing of currency transactions.

- 6 **Redirecting fossil fuel subsidies** – phasing out subsidies to free up substantial amounts of public funds to be redirected to climate finance.
- 7 **Special Drawing Rights (SDRs)** – reserve assets created by the IMF that could be converted into hard currency or used to mobilise private capital.
- 8 **The International auctioning of national carbon emission permits (or ‘assigned amount units’ – AAUs)**
- 9 **Auctioning of domestic revenue permits: the EU Emission Trading Scheme (ETS)** – governments auction a proportion of their emissions’ allowances to the private sector as a means to raise revenue.

To assess the relative merits of each proposal, our first step is to locate the proposals on two spectrums:



In respect of the first spectrum, it is suggested that there is distinct advantage if a mechanism is broadly **international** in form thus avoiding the ‘domestic revenue’ problem noted by Müller (2008), where money intended for international purposes gets directed to national budgets. This problem is even more relevant in the context of the current economic crisis as governments are under strong pressure from their electorates to spend revenue domestically rather than abroad.

In respect of the second spectrum, it is suggested that a considerable advantage accrues if a mechanism is **diverse** in its ‘incidence’. That is, that the burden of payment of revenue is not concentrated on one particular group, and thus potentially subject to lobbying for repeal, but more economically spread out. Proposals that are more ‘international’ and ‘diverse’ are therefore assessed more favourably than those that are ‘domestic’ and ‘concentrated’.

Following this stage, the proposals are then assessed against two sets of criteria and indicative scores assigned. The sets of criteria are divided into first-order (deemed essential) and second-order (deemed desirable).

In identifying the appropriate criteria we draw on the considerable work that has been carried out in this area by official agencies, NGOs and policy-makers.

The first-order criteria are:

- **SUFFICIENCY** – where the funds generated are substantial enough to be part of a ‘portfolio’ of mechanisms which could collectively raise a significant proportion of the annual \$100 billion estimated requirement for mitigation and adaptation.
- **PREDICTABILITY** – where funds are generated in as stable and predictable a way as possible.
- **EQUITY** – where contributions reflect both historical responsibility and capacity to pay.
- **ADDITIONALITY** – where funds are ‘new and additional’ to existing aid commitments.
- **VERIFIABILITY** – where funds are collected and disbursed in a transparent and verifiable manner.

Second-order:

- **EFFICIENCY** – where as much economic efficiency as possible should be achieved, but not to the extent that it conflicts with the first-order criteria, particularly that of equity.

- **EASE OF IMPLEMENTATION** – where mechanisms that can be readily implemented are preferred, all other things being equal.
- **CO-BENEFITS** – where proposals are preferred that have positive developmental or environmental impacts.

Although we conclude this assessment with a recommendation based on these criteria, it should be emphasised that the primary role of this paper is to establish clear principles and criteria upon which current and future proposals can be assessed. Our intention is to develop a way of thinking about the issues inherent to climate change financing. We undertake this by assessing the prospective mechanisms on three occasions through different lenses. A broad scoring system is introduced to differentiate the financing instruments. We conclude with a suggestion of a cluster of mechanisms that could generate \$72.5 billion annually to finance mitigation and adaptation measures in developing countries. This would go a long way to meeting the \$100 billion per year in transfers from developed countries committed to at COP-15 (Copenhagen).

Introduction

Climate change is now widely accepted as a phenomenon to which we must respond. The current environmental crisis is directly linked to fossil-fuel based industrialisation of the developed world and increasing demand on the world's natural resources by a growing global consumer class. At the same time billions still live in poverty. Whilst the impacts of climate change are being felt globally, they fall disproportionately on the poorest countries – with fewer resources available to deal with the effects, developing countries are particularly vulnerable to adverse changes to their climate.

Increasing incidence of drought and famine, particularly in Africa, starkly illustrate this vulnerability. Risk of water and food shortages on the continent are expected to increase. According to the UNFCCC (2007a) 75–220 million people in Africa will face more severe water shortages by 2020, with a potential increase in conflicts as almost all of Africa's 50 water basins are trans-border.

A consensus has been reached for the need to keep temperature increases below 2°C, seen as the threshold beyond which feedback loops become increasingly likely to kick-in, leading to a rapid acceleration of the rate of climate change as it becomes catastrophic and irreversible (Spratt, 2009).

In practice, if we are to have a 93% chance of achieving this, we must stabilise atmospheric greenhouse gas (GHG) concentrations below 350ppm carbon dioxide equivalent (CO₂e).¹ To put this into context, recently published figures from the World Meteorological Organisation show that atmospheric levels are currently at 389ppm (WMO, 2011). If we are to achieve this we urgently need to start to decarbonise the global economy – shifting from fossil fuels to renewable energy.² This would be best achieved through a global deal, binding all countries to reduce their emissions and incentivise investment into clean technology. However even if this target is met, which currently looks unlikely, developing countries will continue to face the impacts of current levels of greenhouse gas concentrations in the atmosphere.

Consequently, and through no fault of their own, they are seeing their development prospects fundamentally threatened by the reality of the environmental crisis. The provision of large amounts of finance will be needed to help fund these two key processes in developing countries:

- **MITIGATION** – where all developing countries need to shift to a sustainable, low-carbon growth trajectory.³
- **ADAPTATION** – where countries have to adapt to climate change that is already 'in the system'.⁴

1 Meinshausen (2006) cited in Anderson and Bows (2008).

2 At the same time there needs to be a substantial decrease in current levels of material consumption in developed countries.

3 Although transfer of technology is also a vital imperative, this paper focuses primarily on the issue of finance.

4 'Adaptation' in this context generally refers to measures to reduce impacts ex ante rather than to respond to them ex post as with disaster relief.

Both the practical necessities and the moral responsibility for dealing with these two processes are clear, but the question remains of how financing them is best achieved. It is to this question that this report will contribute.

By first setting the context, we illustrate that the scale of financing needed to tackle climate change is far greater than the current level of commitment from developed countries. In response, finance mechanisms have been proposed to help meet this gap. Furthermore the issue is now on the agenda at high-level meetings such as the Cannes G20 Summit in 2011 where notably new and innovative sources of finance were included in the final declaration, such as the Financial Transaction Tax and bunker fuels.

There is an urgent need now to build on this momentum, particularly at forthcoming COP meetings,⁵ if we are to meet the financing needs of mitigation and adaptation and help avoid the dangerous impacts of climate change.

The aim of this report is to provide a tool-kit for interested parties to navigate their way through these proposals.⁶ By providing a set of criteria it enables us to assess and compare different finance mechanisms, helping us to better understand how future climate financing needs can be met and inform decision makers.

5 Conference of Parties (COP) is the governing body of the UN Framework Convention on Climate Change, the overall objective of which is to stabilise atmospheric greenhouse gases at a level that would prevent dangerous climate change. COP advances the implementation of the Convention through the decisions it takes at its annual meetings.

6 There are a large number of financing mechanisms which have been proposed – this paper assesses the principal ones with the aim of demonstrating how they can be assessed and compared.

PART 1 The context

1.1 Estimates of financing requirements

1.1.1 Mitigation

The first point to make when considering the costs of funding climate change mitigation is the inherent uncertainty involved.

Based on the need to keep atmospheric concentrations within the 450–550ppm CO₂e range – assumed necessary to provide at least a chance to keep the temperature rise below 2°C (Stern, 2006) – the Intergovernmental Panel on Climate Change (IPCC) estimates that annual mitigation costs could equal between 0.2% to 3.5% of global GDP – or \$78 billion to \$1,141 billion (IPCC, 2007). Other agencies have estimated annual mitigation costs at \$300 billion (The International Energy Agency, 2010) and \$200–210 billion (UNFCCC, 2007). These wide variations highlight the huge uncertainties involved.

Whilst these estimates are very large, they are dwarfed by the \$4 trillion spent by developed countries on the financial crisis so far (Oxfam, 2009) or the \$1.6 trillion of annual global military spending (SIPRI, 2010). More importantly, mitigation costs do not compare with the cost of failing to act. The Stern Review suggests the economic consequences of the level of climate change resulting from ‘business as usual’ would be anywhere between 5% and 20% of global GDP, ‘now and forever’ (Stern, 2006).

Also, the longer we delay the worse the problem becomes and the more expensive it will be to fix. In fact, recent evidence on the link between atmospheric concentrations and climate change suggests that a) concentrations are accelerating faster than had previously been assumed, and b) the ‘safe’ threshold beyond which we risk catastrophic and irreversible climate change is well below the 450–550 range – suggesting that Stern’s original estimates now look over-optimistic.

Anderson and Bows (2008) point out that Stern underestimates mean annual growth in CO₂e emissions between 2000 and 2006. Stern has since revised upwards his cost estimate from 1% to 2% of GDP. However it needs to be borne in mind that this would only keep concentrations below the 550ppm CO₂e level, a threshold which has also been contested. Meinshausen (2006)⁷ finds that a concentration level of 550ppm CO₂e leads to an 82% probability of an increase in temperature of more than 2°C. In fact if we are to have a 93% chance of keeping temperature change below 2°C, concentrations need to be kept below 350ppm CO₂e. To put this into context, we were already at 420ppm CO₂e by the middle of 2008 and CO₂ emissions continue to grow at a rate of 3% per year. If this current trend continues, within less than a decade a temperature rise of more than 2°C will become increasingly probable.

Despite the inherent uncertainties involved, the situation is clear. If we are to avoid irreversible and catastrophic climate change we need to urgently change course and start to decarbonise our economies. This will cost hundreds of billions of dollars per year over the coming decades, but this is a fraction of the cost of failing to act.

⁷ Cited in Anderson and Bows (2008).

1.1.2 Adaptation

As with mitigation, likely costs of funding adaptation are subject to huge uncertainties, as reflected by the wide variations in estimates of adaptation funding requirements (see Table 1).

First, the various agencies have considered different aspects of adaptation when making their estimates. For example, the World Bank's Economics of Adaptation to Climate Change (EACC) Study (World Bank, 2010) includes impacts on health, ecosystem services, and the effects of extreme weather events – explaining the substantially higher estimates of \$75–100 billion. Secondly, much uncertainty remains about the effects that climate change will have on local and regional weather patterns in different parts of the world.

Despite these uncertainties, it is clear that annual costs of funding adaptation to climate change in developing countries will be very large. Moreover, and as previously argued, the ultimate extent of these requirements will be strongly influenced by the extent to which climate change is mitigated today: the more we mitigate now the less we will have to fund adaptation in the future.

TABLE 1 Estimated costs of climate adaptation in developing countries

Agency	Annual financing requirements (US\$ billions)
SHORT-TERM ESTIMATES (2010–2015)	
World Bank	9 – 41
Stern Review	4 – 37
UNDP	83 – 105
MEDIUM TERM (to 2050)	
UNFCCC	28 – 67
World Bank (EACC)	75 – 100
Project Catalyst	15 – 37

1.1.3 The Funding Gap

Today there is a huge gap between climate finance needs and current revenue generating mechanisms. According to the World Bank (2010) annual climate finance over 2008–2012 (both mitigation and adaptation) amounts to roughly \$10 billion a year. This includes revenues from market-mechanisms (for example the Clean Development Mechanism and the Joint Implementation – organised under the Kyoto Protocol) and new bilateral and multilateral climate funds. There is now an urgent need to scale up finance to fund climate mitigation and adaptation if we are to have a chance of avoiding the dangerous impacts of climate change.

1.2 Financing climate activities – international institutions and commitments made by the developed economies

1.2.1 Recap of the original *Assessing the Alternatives* report:

The Conference of Parties (COP) was established by the UN General Assembly to create a Framework Convention on Climate Change (FCCC). *'The ultimate objective of the Convention, and any legal instruments the COP adopt, is to achieve the stabilisation of atmospheric greenhouse gases at a level that would prevent dangerous anthropogenic interference with the climate system'*.⁸

Signed at the Rio 'Earth Summit' by 154 states and the European Union, the Convention entered into force in March 1994. While developed economies – termed 'Annex I' countries – were committed to making voluntary cuts in their emissions, no such requirements were made of the developing economies. In 1997 the Kyoto Protocol was adopted and entered into force in 2005 and remains the primary mechanism to deal with climate mitigation. Under the Protocol, Annex I (developed) countries are committed to reducing total greenhouse gas emissions to below their 1990 level during the 'first commitment' period of 2008–2012, the end of which we are fast approaching.

Huge costs are involved if the COP are to meet this objective – as the previous section illustrates. Yet as developing countries have little historical responsibility for climate change, and a limited ability to finance climate activities, the burden should fall disproportionately on developed countries. The Convention explicitly states that responsibility for dealing with the problem is not uniform, but should be a function of culpability (i.e. the 'polluter pays') and capacity (i.e. a country's level of development). This is described as 'common but differentiated responsibilities' (CBDR), where developed economies are expected to take the lead:

*'The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources [and] ... such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article.'*⁹

BOX 1 Responsibility for financing mitigation vs. adaptation

An important distinction between the responsibility to finance adaptation and mitigation needs to be made.

ADAPTATION Here we are essentially talking about compensatory payments to developing countries for the environmental damage caused by the process of industrialisation in the developed world. The responsibility for financing adaptation should therefore fall on developed countries.

MITIGATION As with adaptation, there is an obligation for developed countries to contribute to mitigation in developing countries. However the scale of contribution between developing countries should be differentiated. For large emerging economies – e.g. China – there is some responsibility for climate change creation (from which they benefit) and they should make a contribution to their own mitigation process. For low-income countries, there is no such responsibility, and they have hardly benefited from fossil-fuel driven industrialisation. Moving to renewable energy, however, will cost them relative to fossil fuels, and so developed countries should fund the entire mitigation process.

⁸ UNFCCC (1992) Article 2.

⁹ Cited in Overseas Development Institute (2009).

This commitment was further emphasised at the 13th Conference of the Parties (COP-13) meeting in Bali in December 2007, which brought the United States and emerging economies into climate negotiations. The resulting 'Bali Action Plan' established a framework for subsequent negotiations focusing on the four major pillars of climate policy that need to be addressed: mitigation; adaptation; technology development and transfer; and financing. With regard to finance, the Bali Action Plan states that the Convention include:

*'Enhanced action on the provision of financial resources and investment [including] Improved access to adequate, predictable and sustainable financial resources and financial and technical support, and the provision of new and additional resources, including official and concessional funding for developing country Parties.'*¹⁰

1.2.2 Changing commitments post Copenhagen

Our original report was published ahead of the 2009 COP-15 in Copenhagen. Here we bring an update on the new finance commitments made in the last two years.

Stakeholders were left discouraged and despondent after COP-15 when leaders failed to reach a binding global deal on emissions reduction targets. Yet some hope was restored when, in a last minute bid to save negotiations, members laid out concrete figures and timelines for climate finance as they recognised the 'Copenhagen Accord'.¹¹

While the commitments are voluntary, developed countries that signalled their support for the Accord submitted quantified emission targets for 2020. In addition some forty-three developing countries submitted nationally appropriate mitigation actions for inclusion in the Appendices to the Accord. However according to a UNEP report (2010) there is a likely gap between expected emissions as a result of the pledges and emission levels consistent with the 2°C limit in 2020. Whilst in reality the commitments made fall short of what is needed, they do set a precedent for future negotiations.

In addition, as part of the Accord, developed countries also pledged to mobilise \$30 billion between 2010 and 2012 (fast-track finance) and \$100 billion a year by 2020 for climate mitigation and adaptation activities in developing countries.

Whilst significant funds had now been pledged a number of issues are worth noting. Firstly the country breakdown for the fast-track finance period is as follows: Japan 50%; EU 32%; US 11%; Norway 3%; Australia 2%; Switzerland 1%; Canada 1% (World Resource Institute, 2010). These proportions of finance pledged do not reflect the principle of common but differentiated responsibility in that, according to a number of measurements, the greatest responsibility lies with the US.¹²

Secondly the Accord lacked any detailed discussions or conclusions on where the money would come from. In response, in February 2010 the UN Secretary General established the High Level Advisory Group on Climate Change Financing (AGF) with a remit to identify practical proposals needed to mobilise \$100 billion a year by 2020. The subsequent report identified potential sources of finance from a) public sources of finance, b) development bank-type instruments c) carbon market finance and d) private capital (AGF, 2010).

Further progress was made at COP-16 in Cancun (2010) when governments agreed to establish a Green Climate Fund (GCF). Indeed fund institutions are an essential element of a successful climate financing framework. They must ensure revenue raised is effectively and

10 Cited in Overseas Development Institute (2009).

11 Note that the 'Copenhagen Accord' it is not a legally binding agreement.

12 According to a number of responsibility and capacity indicators – including Stern (2006) and the Adaptation Finance Index (Oxfam, 2007).

equitably managed and directed to countries in most need and to the right projects. The GCF will, via dedicated funding windows, manage and distribute the \$100 billion pledged to finance (equally) mitigation and adaptation activities in developing countries.

The fund's exact policies and operating guidelines are currently being designed by a Transnational Committee (TC) made up of 40 members – 15 from developed countries and 25 from developing countries. The fund's architecture is due to be agreed at forthcoming COP meetings. Once the GCF becomes operational the existing World Bank Climate Investment Funds – that have to date delivered small-scale finance¹³ – will (according to their sunset clause) be phased out. This would enable fund institutions to become more streamlined with the GCF receiving the bulk of climate finance.

So where does this leave us? As we head towards 2012 two major challenges lie ahead. The 'first commitment' of the Kyoto Protocol will end and leaders will need to agree on renewed emission reduction targets (see Box 2). Secondly, with the fast-track finance period due to end at the beginning of 2013, financing mechanisms need to be in place ready to start mobilising resources to fill the GCF and help meet the \$100 billion a year commitment made by 2020. The ability of leaders to agree on steps to close these gaps at the upcoming COP meetings will be crucial.

BOX 2 The post-Kyoto challenge

Political challenges stand in the way of extending the Kyoto agreement. Developing countries remain reluctant to agree a cap on their emissions, considering they hold little historical responsibility for climate change. Their willingness to commit to emissions targets is further hampered by the fact that Japan, Russia and the US (all major emitters of carbon emissions) have stated that they do not intend to sign an extension to the Kyoto agreement. Negotiations at the forthcoming COP meetings will be pivotal if leaders are to reach an agreement on future emission reduction targets.

¹³ Visit www.brettonwoodsproject.org for detailed analysis and shortcomings of the World Bank Climate Investment Funds.

PART 2 The assessment

2.1 Defining the criteria

One of the few successes to come out of COP-15 (Copenhagen) was the formal recognition on the part of developed countries that developing economies would need substantial annual investments to finance climate change mitigation and adaptation, and that they had a responsibility to contribute to this. The figure that was committed to was \$100 billion per year, and proposals to fill the Green Climate Fund use this as a benchmark. Following the policy dialogue, we also adopt \$100 billion as our target, with the 'sufficiency' of potential sources being judged with respect to this figure.

A caveat is needed, however. While stable, long-term transfers of \$100 billion per year would be a tremendous advance from where we currently are, it is important to recognise that this falls well short of what is actually required. The most recent funding needs for adaptation alone are between \$75 and \$100 billion (World Bank, 2010), and it is likely that investments in mitigation activities will at least equal that. Consequently, the real funding requirements will be closer to \$200 billion. Nevertheless our primary focus in this paper is in assessing options to reach the \$100 billion that has currently been committed to.

We reintroduce, below, the same assessment criteria employed in our earlier report, *Assessing the Alternatives* (2009).¹⁴

2.1.1 Mitigation

It has been argued that effective mitigation of climate change will be best achieved as part of a binding global deal to cut carbon emissions. However we must deal with the world as we find it today, that is – the political dynamics of agreeing such a deal is complex (as the outcome of Copenhagen clearly illustrated). Also many developing and emerging economies are reluctant to commit to emission reductions when they hold little historical responsibility for climate change and fear impacts on their development path.

And so the question becomes can we mobilise, and how, the financial investment required for a shift to a low-carbon economy in the absence of a global deal? Also the argument can be made that as more countries shift to a low-carbon economy, the less they stand to lose from agreeing a global deal on emissions. Therefore whilst continuing to recognise that a global deal is the best way to mitigate climate change – proposals are not assessed exclusively against the criteria of a global deal.

Criteria for assessing proposed mitigation mechanisms are thus a) does it boost low-carbon investment and b) is the nature of the mechanisms acceptable?

What constitutes acceptable is answered with reference to a further set of criteria:

¹⁴ There has been considerable work carried out in this area by official agencies, NGOs and policy-makers, which we draw on here. In particular, we have sought to ensure that the criteria are compatible with those originating from developing countries, not least those set out by the G-77.

2.1.2 Adaptation and mitigation criteria

The report follows a two-stage assessment process. Mechanisms are assessed against a **'first-order' criteria**, considered essential for any mechanism:

- **SUFFICIENCY** Total revenue raised needs to be sufficient in relation to the annual \$100 billion target – as previously argued. Mechanisms score according to this criterion in respect of the degree to which they can contribute to this overall amount.
- **PREDICTABILITY** Stability of revenue is critical to effective planning of expenditure. In practice, Official Development Assistance (ODA) has proven to be no less volatile than private capital flows in recent decades (UN DESA, 2006)
- **EQUITY** To be acceptable any mechanism(s) must be equitable in that the 'polluter pays' principle is upheld, but also take account of ability or capacity to pay and how this changes over time.
- **ADDITIONALITY** To be acceptable revenues raised from any mechanism(s) need to be new, additional and distinct from overseas development aid (ODA) – the argument being two-fold.

Firstly there is already insufficient financing available to fund the Millennium Development Goals (MDGs) – even before the impact of climate change has been taken into account. The significant threat, should climate finance come from existing ODA budgets, is that traditional aid spending will be greatly diluted – delaying the achievement of the MDGs even further.

Secondly, the nature of climate finance is fundamentally different to that of aid and other financing for development – adaptation finance is compensatory in nature, with developing countries being compensated for the environmental damage caused by the process of industrialisation in the developed world; mitigation finance is an obligation on the part of rich countries, following from their disproportionate exploitation of the environment, to provide developing countries with the resources they need to grow along a low-carbon development pathway. It is an essential requirement that funding for climate change must be distinct from and additional to finance pledged for ODA.

- **VERIFIABILITY** The funds raised (and disbursed) should be verifiable, in that it is possible for independent sources to monitor and report on the process accurately and in a timely fashion.

Finance mechanisms that pass the 'first-order' are further considered in relation to a set of **'second-order' criteria**:

- **EFFICIENCY** The first of these is economic efficiency. Some might argue that this should be in the first grouping, deeming it to be essential. However it may be that there is no mechanism that would be considered fully efficient in economic terms but that would also meet the other criteria set out above. There is also the prospect that efficiency could conflict with equity considerations. We therefore take the position that efficiency is the less fundamental of the criteria and place it in the second-order set.
- **EASE OF IMPLEMENTATION** This takes into account a) whether a mechanism builds on existing institutions and infrastructure, b) whether it builds on existing international agreements or requires fresh negotiations, and c) the speed with which the mechanism could be introduced.
- **CO-BENEFITS (OR LACK OF CO-COSTS)** While the focus here is on funding to meet mitigation and adaptation needs, any mechanism employed will have side-effects, which may be positive or negative from a development or environmental perspective. As well, mitigation

proposals need to be assessed on the extent to which they lay the foundations for an acceptable and effective global deal.

Our complete set of criteria is therefore as follows:

First order:

SUFFICIENCY
PREDICTABILITY
EQUITY
ADDITIONALITY
VERIFIABILITY

Second order:

EFFICIENCY
EASE OF IMPLEMENTATION
CO-BENEFITS (or lack of co-costs)

2.2 A typology of proposals

2.2.1 Mitigation

As illustrated in the beginning of this paper, to have a 93% chance of keeping temperature change below 2°C, atmospheric CO₂ concentrations must be kept at no more than 350ppm. It is essential that we are able to ensure that the quantity of global emissions follows this scientifically determined trajectory with as much accuracy as possible.¹⁵ Therefore, when considering mitigation mechanisms, we consider a spectrum from quantitatively **certain** to **uncertain** in terms of total emissions. A global deal to achieve and finance climate change mitigation needs to be situated firmly at the certainty end of this spectrum.

No less important is the need to safeguard the development prospects of the global South. On both moral and practical grounds a global deal that fails this test cannot succeed. But this is a dynamic rather than a static process: as countries develop and move to a sustainable, low-carbon development path their external financing needs will change, as will their responsibility and capacity to contribute. Any global mitigation package needs to be flexible and dynamic enough to evolve as these factors change.

Again, if we think in terms of a spectrum from **dynamic** to **static**, a global deal to ensure that the process of climate change mitigation supports real and sustainable development needs to be located at the dynamic end of this spectrum.

2.2.2 Adaptation

Turning to adaptation proposals, Müller (2008) makes an important distinction between their '**international**' and '**domestic**' nature. Domestic refers to those mechanisms where revenues can be identified as national resources in some way, which would then be transferred either directly or via an international body charged with distributing these national contributions. In contrast, international options are where a dedicated international body collects the money directly from a source outside the purview of any national jurisdiction. A spectrum of International versus Domestic is therefore identified.

The argument is that international mechanisms are inherently preferable because of the 'domestic revenue' problem. This is when money intended for international purposes gets directed to national budgets. The 'domestic revenue' problem is even more relevant in the

¹⁵ See page 9.

context of the current economic crisis as governments are under strong pressure to spend money domestically at home rather than send it abroad.

The final category is ‘**incidence**’ – or where the burden of the revenue raising falls. When considering issues of equity, commentators generally focus upon what is fair at the level of the nation state. However, even if the mechanism raises revenue in a way that reflects international responsibility and capacity to pay this leaves open the question of how the burden is shared within each country. For example, national contributions could be raised by levying a tax on one particular sector – say oil companies. Whilst this appears reasonable and fair, this level of concentration raises difficulties.

Where revenue is raised entirely – or disproportionately – from one particular group or sector, there is a real risk that it could be undermined over time, either through lobbying efforts or through a decline in profitability in that area, for example. On the other hand, in some sectors of the economy a modest increase in costs (through the levying of a tax, for example) would be widely diffused and so would not necessarily create an effective lobby against it. The spectrum identified is therefore that of **diversity** versus **concentration**.

We posit therefore the following spectrums upon which the financing mechanisms can be located:

Mitigation

- (QUANTITATIVELY) **CERTAIN** → (QUANTITATIVELY) **UNCERTAIN**
- (DEVELOPMENT) **DYNAMIC** → (DEVELOPMENT) **STATIC**

Adaptation

- **INTERNATIONAL** → **DOMESTIC**
- **DIVERSE** → **CONCENTRATED**

Ideally, we would seek mechanisms that are **dynamic** in terms of development and provide as much **certainty** as possible in terms of total emissions (for mitigation), and are both **international** and **diverse** (for adaptation).

It should be noted that no one mechanism may necessarily pass all of these tests.

2.3 Organising the proposals into the typology

2.3.1 A typology of mitigation proposals

It can be argued that, ultimately, effective climate change mitigation can only be achieved within the framework of an acceptable global ‘deal’. From a straight economics perspective, there are only two possible forms that such a ‘deal’ could take: quantity-based or price-based. In policy terms these two options equate to a global limit, or ‘cap’, with national allocations and some form of trading; or to a global carbon tax with redistributive transfers.

From the perspective of economic theory these two options are equivalent. In practice this is not quite the case. In reality, we can either have certainty over quantity or over price. If we set a particular ‘cap’, we cannot say accurately what the price of carbon will be. Similarly, for any given tax rate, we cannot say what the reduction in physical emissions will actually be.

From a direct environmental perspective, a global cap theoretically provides certainty that emissions remain within set limits, and is therefore to be preferred on the basis of the ‘spectrum’ set out in the previous section.

Nevertheless, a number of practical issues should be noted – all of which pose challenges for achieving a global cap on emission reductions.

Firstly developing countries are – quite rightly – extremely reluctant to sign up to a physical limit on their carbon emissions. Part of this difficulty turns to how national carbon ‘budgets’ would be allocated. Indeed a cap and trade system could be implemented globally in a way that is completely inequitable – if allocation rights were based on the pattern of current emissions (i.e. ‘grandfathering’) this would bind in existing global inequalities for the foreseeable future.

If a fair and equal global deal were to be proposed it is more likely that developing countries would now (or in future) sign up. A number of proposals have been put forward:

The ‘Cap & Share’ proposal, developed by the Foundation for the Economics of Sustainability (FEASTA):¹⁶ allocates emission rights equally on an individual basis globally. Trading then takes place within the system, resulting in huge transfers from (relatively high polluting) rich people and rich economies, to (relatively low polluting) poorer people and poorer economies. However the Cap & Share is not dynamic at all in terms of emission rights, as these are set at the outset – only changing population sizes would alter this.

The ‘Contraction & Convergence’ proposal, developed by the Global Commons Institute (GCI):¹⁷ here an overall budget is set and allocations are ‘grandfathered’ within this to nations on the basis of current emissions. However ‘contraction’ refers to the progressive reductions in the overall global ‘budget’, while ‘convergence’ describes the process where allocations move from allocations based on current emissions to those based on an equal per capita share of emission rights. Unlike Cap & Share, however, these remain at the level of the nation state – which then has to determine how the national ‘budget’ is allocated within their own borders – rather than with the individual citizen. Contraction and Convergence is clearly dynamic in nature, moving from the status quo to what could be considered an equitable international allocation. Over the last twenty years, in an effort to help negotiators at the UNFCCC on how they might agree an effective and equal global deal, GCI has developed detailed proposals for contraction and convergence rates.¹⁸

Whilst a global cap could be the best outcome, in terms of emission reductions, it is important not to make the perfect the enemy of the good. For a variety of reasons, it may be that neither developing nor even developed countries would accept such a framework, which requires us to look at other options.

For a comprehensive alternative to quantitative limits on emissions one would have to examine a global carbon tax of some kind. While this would not bring the same certainty as a cap, it could still be extremely effective. Again however, the devil is very much in the detail. A straight global carbon tax with no redistribution would be extremely regressive – disproportionately affecting the poorest, both within and between countries. However the proceeds of a global carbon tax could be redistributed globally according to a formula considered equitable – perhaps based on Greenhouse Development Rights (GDR) weightings (Baer et al. 2008).¹⁹ This too could provide the North-South transfers described above, though the process would not be ‘hard-wired’ into the system as with cap and trade. However as the tax would have to be collected domestically and therefore pass through national budgets, it would inevitably be more discretionary and so subject to national political factors.

16 <http://www.capandshare.org>

17 <http://www.gci.org.uk>

18 Further details on these studies for contraction and convergence rates can be found at: <http://www.gci.org.uk/rates.html>

19 The GDR is one of the most recognised systems by which to assess which countries ought to shoulder what proportion of financial responsibility, in respect of both mitigation and adaptation.

And so, whilst a global deal based on an emissions cap may be preferable if implemented in an ‘ideal’ form, there are practical and political considerations associated with both. Nevertheless, either a carbon tax or cap and trade system would be preferable to doing nothing and both could achieve similar results in practice. The priority here is to achieve the level of carbon emissions needed to ‘*preserve a planet similar to that on which civilisation developed and to which life on Earth is adapted*’ (Hansen et al. 2008) and to do so in a way that is equitable and safeguards the development prospects of the South.

2.3.2 A typology for adaptation proposals

In this section we organise adaptation finance mechanisms into categories of direct budget contributions and new sources. Taking each proposal in turn, they are described and located on the two spectrums:

- **INTERNATIONAL** → **DOMESTIC**
- **DIVERSE** → **CONCENTRATED**

We also consider the spectrums in respect of mitigation when these apply.

- (QUANTITATIVELY) **CERTAIN** → (QUANTITATIVELY) **UNCERTAIN**
- (DEVELOPMENT) **DYNAMIC** → (DEVELOPMENT) **STATIC**

A: DIRECT BUDGET CONTRIBUTIONS

It is assumed that direct budget contributions, raised from various taxes for example, will continue to play an important role in financing climate activities. With developed countries now committing \$30 billion over the period 2010–2012 under the Copenhagen Accord, and the current absence of agreements on new financing instruments along with their timely implementation, this is likely to be paid for by direct budget contributions (AGF, 2010) – assuming of course these pledges are in fact met. However the relative importance of public finance will differ for mitigation and adaptation.

ADAPTATION It is the world’s poorest that are most vulnerable to climate change and it is these communities that adaptation finance needs to reach. However adaptation activities, such as planting mangroves for flood protection, will not attract private finance as they do not generate any returns on investment. Therefore public finance will play an important role in funding adaptation in developing countries and ensuring the most vulnerable communities are reached (Oxfam, 2010).

However this raises the question of the incidence of raising public funds, in particular the progressivity of any tax introduced. For example, a financial transactions tax levied disproportionately on hedge funds would be far more progressive than say funding from general taxes. In the case of a general carbon tax, it could be individuals (or sectors) within countries that are not historically responsible for climate change (or have the capacity to pay) who are hit hardest, which would be regressive.

MITIGATION Private finance will play a significant role in climate mitigation, considering the profit opportunities in developing a low-carbon infrastructure. Nevertheless public investment is required to incentivise the flow of private capital to the renewable energy sector and to also ensure pro-poor investment (ibid. 2010).

China + G-77 – direct budget contribution of between 0.5% and 1% GDP of developed countries

The Chinese submission to the UNFCCC Secretariat – which has been adopted by the G-77 in a modified form²⁰ – is the most straightforward and, in some ways, the most intuitively appealing of the options available. The China + G-77 group have argued that developed countries should fund adaptation (and mitigation) in developing countries via central government budget support equivalent to 0.5–1% of GDP.

This proposal was included in our original report. And whilst it is yet to be implemented, it has been included again as it has the political backing of more than 130 developing countries and the AGF report makes reference to the proposal as a potential long-term financing source.

The proposal would raise between \$222 and \$444 billion annually (based on 2011 figures²¹) targeted to mitigation, and around a quarter (\$56–111 billion) would fund adaptation activities.²²

In terms of the international–domestic spectrum for adaptation, the proposal is firmly in the latter camp and very much subject to the domestic revenue problem. Secondly, by funding the mechanism through a general levy on central government budgets the incidence of the proposal falls in the same proportion as does the national taxation system – it is therefore diverse.

Using the adaptation typology introduced above, the G-77+ China proposal is therefore:

- **DOMESTIC**
- **DIVERSE**

B: NEW SOURCES

General Carbon Tax –applying a levy of \$1 per ton of CO₂ emissions in all developed countries

A carbon tax could be an efficient and predictable mechanism to generate climate finance. The AGF proposes applying a carbon tax of \$1 per ton of CO₂ emissions in all developed countries. Assuming total annual OECD emissions amount to 10.9 Gt in 2020, the tax would raise in the order of \$10 billion a year. According to the proposal 100 percent of the revenue would be used for international climate finance.

Whilst we have argued that a quantity-based global deal is preferable, a carbon tax would undoubtedly be an effective means to raise climate finance and also create an incentive for a shift to a low-carbon economy. Nevertheless, the political obstacles surrounding the agreement of a carbon tax in OECD countries (and directing the money to international climate finance) should not be underestimated.

In terms of our mitigation spectrum, the proposal for a tax would not offer quantitative certainty in terms of global emissions as no cap would be introduced. Nevertheless the

20 The elaboration of the proposal by the Philippines government on behalf of the G-77 has considerably more detail than the original, including suggestions of how the finance would be managed through the Financial Mechanism.

21 Based on IMF (2011) figures for GDP of advanced economies.

22 This proportion to climate finance is according to Müller (2008).

proposal would be dynamic as the tax is applied in relation to development levels. The tax is therefore:

- (QUANTITATIVELY) **UNCERTAIN**
- (DEVELOPMENT) **DYNAMIC**

When considering our adaptation spectrum, a general carbon tax is clearly diverse – being diffused across countries and among all consumers of carbon-based products and services. Considering our second spectrum, the tax would be collected domestically. The proposal is therefore:

- **DOMESTIC**
- **DIVERSE**

Sector-specific taxes

Here we introduce current proposals for raising climate finance from the international transport sector. In the context of the now urgent need to mobilise funds in order to fill the recently agreed Green Climate Fund, proposals for taxing emissions from the transport sector are gaining increasing attention and support.

*'A process was established to design the \$100 billion Green Climate Fund under the Conference of the Parties... The design will probably be for a tax on international shipping and aviation.'*²³

Taxing carbon emissions from shipping – a \$25 price per ton of CO₂ emitted from the international maritime sector

According to a recent WWF & Oxfam (2011) proposal, setting a price of \$25 per ton of CO₂ emitted from ships would generate \$25 billion annually by 2020 (assuming global emissions from the sector equal 1 gigaton in 2020). All international maritime carriers would either auction their emissions allowances (much like a cap and trade system where total emissions would be fixed) or simply pay a tax (levy) on the fuel used.²⁴

An agreed amount of the revenue raised would be allocated to international climate finance, the proposal calls for at least \$10 billion, which would be directed to the newly created Green Climate Fund.

Up to 40% of the revenue raised would be used to provide rebates to developing countries as an increase in transport costs is likely to increase the cost of imports. With many developing countries heavily reliant on the import market, especially the food market, any mechanism for global shipping must ensure developing countries are not adversely hit. Therefore a rebate is proposed to compensate for any negative impacts borne by their economies, thus satisfying the principle of common but differentiated responsibilities.²⁵ Finally, a smaller percentage of the revenue would be directed to research and development into cleaner shipping technology.

23 The Texas Tea Party (Available at: <http://texasgopvote.com/global-warming/un-agrees-process-design-global-taxing-scheme-002231>).

24 Applied to all ships because emissions cannot be attributed to individual countries, maritime carriers transport goods from a number of countries to various different destinations.

25 Designing a rebate scheme, whilst essential to the proposal, is complex and further detailed studies on the economic impacts of the tax would be needed. Nevertheless there is a degree of consistency on impact assessments (such as the IMO Expert Group and AGF) suggesting that governments can agree on a mechanism for taxing international shipping emissions with confidence that developing countries would be compensated for any adverse impacts they incur (WWF and Oxfam, 2011).

In terms of the adaptation spectrums, whilst the proposal is clearly international it is concentrated as it focuses on one particular sector.

- **INTERNATIONAL**
- **CONCENTRATED**

Taxing carbon emissions from aviation – a \$25 price per ton of CO₂ emitted from international air travel

The AGF report (2010) proposes a tax on international aviation to generate climate finance. It could be in the form of a levy (tax) on aviation jet fuels for international flights or a separate Emission Trading Schemes for these activities (i.e. place a cap on emissions generated by the sector and auction allowances).

Assuming global emissions from the sector equal 250 megatons in 2020, applying a carbon price of \$25 per ton of emissions would generate \$6 billion annually. To ensure no incidence of the tax on developing countries, this figure excludes emissions from all flights between developing countries and one half of flights between developed and developing countries. While it proposes that between 25% and 50% of the revenues raised should be used for international climate finance, we suggest that 100% earmarking is appropriate in this instance. The link between air travel and greenhouse gas emissions is clear, as is the fact that such a tax would be progressive, both in terms of countries and the individuals within them.

In terms of the adaptation spectrums, a tax on aviation emissions is clearly international and concentrated as it focuses on one specific sector. This situates it on our adaptation as:

- **INTERNATIONAL**
- **CONCENTRATED**

Other taxes

Financial Transaction Tax (FTT)

The AGF (2010) report also considers the option of using revenues from a Financial Transaction Tax (FTT) for climate finance purposes. A number of different FTT proposals have been made in recent years, which would raise revenue from taxing the purchase/sale of assets such as equities, bonds, foreign exchange and their derivatives, at low rates typically between 0.005%–0.5%.

Broadly speaking, proposals can be organised in one of two ways: asset or jurisdiction. For assets, we can further subdivide proposals into those that would tax a single financial instrument and those that would be applied across a range of financial sectors. For jurisdictions, the key distinction is between unilateral (one country) and multilateral (regional or global application).

Of proposals applied to single instruments, the most well known is the Currency Transaction Tax (CTT), sometimes known as the Tobin Tax – named after the economist James Tobin. Tobin's original idea was to levy a small tax on all global currency transactions (i.e. a multilateral tax). A number of studies have provided estimates of the revenue potential of CTTs in recent years. The Leading Group in their report *Globalizing Solidarity: the Case for Financial Levies* (2010) claims that an international CTT could raise \$34 billion a year.

A very different example of a tax on a single instrument that has been in place for many years is the UK's Stamp Duty on shares, which raises around £3 billion per year.

For multi-instrument proposals, Baker et al (2009) propose a multi-tier²⁶ levy on spot equity and bond markets, as well as futures and options markets. Focusing on the US alone, this is a unilateral proposal, where estimated annual revenues are in the region of \$175 billion.

The most comprehensive multi-instrument, multilateral proposal is that of Schulmeister (2009, 2011). Schulmeister proposes a tax on all financial transactions in both spot and derivatives markets, including currencies as well as domestic trades. Revenue estimates are dependent on the tax rate chosen (0.01% to 0.1%) and start from \$286 billion per year.

The most recent example of a multi-instrument, multilateral proposal is that made by the European Commission (EC) in 2011. The EC proposal resembles Schulmeister in its comprehensiveness, being applied to all financial transactions in both spot and derivatives markets. Key differences are (i) currency transactions are exempted, (ii) a very large reduction in derivatives transactions is assumed, and (iii) the tax would only be applied within the European Union. As a result, revenue estimates are substantially lower, at around €57 billion per year (or \$75 billion²⁷).

In terms of our criteria, all FTT proposals can be described as diverse. Although the tax may fall on a particular group in the first instance, it would be distributed throughout the economic system as financial institutions passed on some or all of the tax to their clients. These may be other financial institutions such as asset managers, or corporations engaged in international trade or hedging operations, or companies/individuals with funds at their disposal engaged in the buying or selling of financial instruments. A consequence of this diffusion, however, would be a wide dispersal of the incidence of the tax predominantly amongst the richest sections of society. According to the IMF '*...the distribution of this effect would likely be highly progressive*' (Matheson, 2010: 20).

The international-domestic distinction is more complex. While some transactions – notably currency trades – are clearly international in nature, others are less obviously so. Also, the question of whether a tax would pass through national budgets or be collected at the supra-national level is important for the domestic revenue question. Here proposals made by the Leading Group's Committee of Experts on Innovative Financing (2010) are noteworthy. The Committee proposes levying a Currency Transaction Tax (CTT) through the Continuous Linked Settlement (CLS) bank, a supra-national institution, which settles the majority of global currency trades. Such mechanisms would clearly be both international and diverse on our criteria.²⁸

More broadly, comprehensive FTTs where both domestic transactions and international (currency) transactions fall within the ambit of the tax are thus partly international and partly domestic. One way to proceed therefore could be that revenues from different mechanisms could be distinguished, with those derived from international activities (e.g. currencies) being used to fund global 'goods' such as mitigating or adapting to climate change, and those derived from domestic transactions being used for domestic purposes.

Consequently the approach taken by this paper is that the FTT revenue figures we use are drawn from taxation of the presently untaxed market in currencies, valued at \$1000 trillion a year (Bank for International Settlements, 2010).

26 Where different rates are applied to different instruments.

27 According to <http://www.xe.com>. Calculated on 25th November 2011.

28 The current EC proposals, in contrast, can be characterised as domestic and diverse.

The international component of an FTT of this form (that was earmarked for global public goods such as climate change adaptation) would therefore be:

- **INTERNATIONAL**
- **DIVERSE**

- 1 Where different rates are applied to different instruments.
- 2 According to [www. http://www.xe.com](http://www.xe.com). Calculated on 25th November 2011
- 3 The current EC proposals, in contrast, can be characterised as domestic and diverse.

Redirection of revenues

Redirecting fossil fuel subsidies – phasing out subsidies to free up substantial amounts of public funds to be redirected to climate finance

At the 2009 G20 Summit in Pittsburgh, Heads of States committed to phasing out harmful fossil fuel subsidies which encourage wasteful consumption. Subsidy reform would prove an extremely effective mitigation strategy. According to a G20 commissioned report, the removal of all fossil fuel subsidies in both developed and developing countries by 2020 would reduce atmospheric GHGs by 20% (cited June 2010 Oil Change). Building on these commitments, countries could further agree to redirect the significant public funds freed up to financing mitigation (clean technology) and adaptation activities in developing countries.²⁹

How much would the removal of fossil fuel subsidies raise?

Global subsidies for the production and consumption of fossil fuels are estimated at \$700 billion per year. According to the International Energy Agency, consumption subsidies in developing countries were approximately \$560 billion in 2008. Subsidies from developed countries are harder to estimate and vary considerably (Clifton, 2010). According to the Organisation for Economic Cooperation and Development (OECD) the global total could be as much as US \$100 billion per year whereas Oil Change International (2010) give a more conservative estimate of \$57 billion, \$10 billion of which is in the US alone. A significant proportion of both these estimates represent transfers from Northern governments to companies involved in fossil fuel extraction, processing and distribution.

Phasing out of fossil fuel subsidies and their redirection to climate finance could plug an important gap in the revenues needed to fulfil the climate-finance obligations of developed countries (Friends of the Earth, 2010).

To ensure the principles of ‘common but differentiated responsibilities’ are upheld, a ‘global sequencing and linkage’ process is proposed, i.e. gradually decreasing the level of support, and differentiated in time and by country income level (Oil Change International, 2010):

- Annex I countries commit to phasing out subsidies completely by 2020 – redirecting funds to climate finance. A credible and conservative estimate of fossil fuel subsidies in Annex I countries amounts to \$57 billion annually.
- Middle income and developing countries would start to phase out later (after having benefited from financial and technology transfers for mitigation) and over a longer period.

Whilst \$57 billion a year by 2020 is a significant sum, it will be dependent on the number of countries (and which ones) that participate, the speed at which subsidies are removed, and

²⁹ Clearly there will be political obstacles to overcome to secure from governments a commitment to devote a proportion of these funds to climate change.

the amount they choose to redirect to international climate finance (AGF, 2010). Perhaps of most importance is that, whilst this proposal suggests a huge revenue potential, it can only offer a short-term source of finance as subsidies (as proposed) will be phased out completely within time.

To account for these uncertainties, we have calculated annual revenue transfers from developed to developing countries based on reducing subsidies by 20% per year. By 2020 around \$10 billion worth of subsidies would remain – at which point this would be transferred to fund climate (particularly mitigation) activities in developing countries.³⁰

TABLE 2 Annual revenue generated (US\$ billions) from phasing out fossil fuel subsidies in developed countries (2012–2020)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Annual Subsidy	57.00	45.60	36.48	29.18	23.35	18.68	14.94	11.95	9.56
Developing country transfer	11.40	9.12	7.30	5.84	4.67	3.74	2.99	2.39	9.56
TOTAL (2012–2020)									57.01
Average annual revenue									6.5

Considering the mitigation impacts of this proposal, this mechanism is dynamic (due to the sequencing of subsidy removal in relation to income level) and (quantitatively) uncertain as it is changing the price of carbon, and whilst this will lead to a change in the quantity of carbon emissions the degree to which this is achieved is unknown. Situating it on the mitigation spectrum, the proposal is therefore:

- (QUANTITATIVELY) **UNCERTAIN**
- (DEVELOPMENT) **DYNAMIC**

In terms of the international–domestic spectrum for adaptation, the proposal is clearly in the latter as it will generate national public funding. However it is diverse as it does not target one particular sector/group but instead all those linked to the energy sector. Using the adaptation typology introduced above, the removal of fossil fuel subsidies is therefore:

- **DOMESTIC**
- **DIVERSE**

Special Drawing Rights (SDRs) – reserve assets created by the IMF that could be converted into hard currency or used to mobilise private capital

The SDR is an international reserve asset, created by the IMF in 1969 to be used by member countries to generate liquidity in the event of balance of payments difficulties. They are allocated to IMF member countries in proportion to their quotas, which are relative to a

³⁰ During this period middle income countries could begin to phase out their subsidies (as suggested by the ‘global sequencing and linkage’ process) and hence the annual revenue raised could be even higher. However due to the scope of this paper we have not accounted for these additional potential sources and have instead calculated a conservative estimate based on only the richest countries removing subsidies.

country's GDP – therefore developed countries hold the majority of SDRs.³¹ Its value is based on a basket of four key international currencies, and can be exchanged for freely usable currencies, i.e. when SDRs are converted into hard currency the funds can be used for any purpose (IMF, 2011a). To date the IMF has allocated SDRs on four occasions, they were most recently issued in 2009 in response to the global financial crisis when SDRs worth \$250 billion were allocated, \$150 billion of which went to developed countries (based on their quotas).

There have been a series of proposals for how SDRs can be used for climate finance. They fall into two categories: a) converting SDRs into hard currency and/or b) committing SDRs to support the capitalisation of a third party entity which would leverage private finance (Birdsall and Leo, 2011).

Referring to the latter, the IMF proposes developed countries commit \$100 billion of their 2009 allocation to capitalise a *Green Fund*. Once its capital base is established, the fund would issue low-cost 'green bonds' to be sold to private investors and other holders to generate additional finance for mitigation purposes. As a result the fund would be able to mobilise a multiple of its paid-in capital (Bredenkamp and Pattillo, 2010). According to the European Climate Foundation (2009) \$100 billion of SDRs could mobilise \$7 billion annually. It should be noted that the Green Fund described here focuses solely on mobilising resources, how they would be allocated is not covered – however this could be directed to the newly created Green Climate Fund.

Action Aid (2010) has proposed that in addition to the above, the IMF should also issue new SDRs on a regular basis to fund climate activities. Both developed and developing countries should convert this new SDR allocation into cash to be transferred to a UNFCCC fund. This proposal would deliver an immediate \$100 billion capital infusion to the fund (from the 2009 allocation) and explains there is no technical limit on the value of future allocations.

Whilst this proposal has the potential to raise a vast amount of funds to finance climate activities, political obstacles should be noted – especially with regard to the US (which hold the majority of SDRs). Currently SDRs acquired by the US Government are considered resources of the Exchange Stabilisation Fund (ESF). Utilising SDRs for global public goods (in this case financing climate activities) would raise policy concerns for the US as essentially it ties up ESF assets that would otherwise provide stability during economic crises (Birdsall and Leo, 2011). This represents a major barrier for any future use of SDRs in climate finance.

In terms of the international–domestic spectrum for adaptation, the proposal is firmly in the latter camp as, once issued, the funds are nationally owned. Lastly, the proposal is diverse for the following reasons. If *new* SDRs are issued, the incidence arguably falls on no-one as it is the creation of an asset. Also if *existing* SDRs are transferred to developing countries they come from developed countries reserve holdings so the impact, such as it is, will be spread across the entire population (with no particular group affected).

Using the typology introduced above, the SDR proposal is therefore:

- **DOMESTIC**
- **DIVERSE**

31 However there is an important debate concerning the fact that developing countries do not have voting rights (which are tied to the size of member countries' financial contributions – or quotas) in line with their economic weight. For example, the economies of the European Union countries amount to just under 24% of the global economy. The economies of Brazil, Russia, India, China and South Africa together make up about 21% of world GDP. But the European countries have 32% of the votes in the IMF, while the latter have 11% (<http://www.economist.com/blogs/dailychart/2011/06/imf-influence>).

Trading markets

In this category we assess both international and domestic auctioning of emissions allowances as potential new sources of revenue.

The International auctioning of national carbon emission permits (or ‘assigned amount units’ – AAUs)

Under the Kyoto Protocol, Annex I countries are allocated a certain level of permitted emissions – assigned amount units (AAUs), each equivalent to 1 ton of CO₂. Where a country has a surplus of AAUs, perhaps due to a sharp reduction in domestic emission requirements, it can sell these to other Annex I countries which need more AAUs than it has been allocated.

AAUs are currently allocated for free. However Norway has proposed that a proportion of AAUs should be auctioned by either an existing or dedicated international body, with the revenue directed to financing for climate activities. The potential revenue raised will depend on a) the total allocation of assigned amount units under the second Kyoto commitment period (2012–2020) and percentage auctioned; b) the per ton price of CO₂; c) the resulting revenue set aside for international climate finance (ODI, 2009).

Based on current emission targets, Whitesell and Vanamali (2009: cited ODI page 64) estimate that 15 billion AAUs will be created annually in the second commitment period. It suggests that \$9–35 billion could be raised annually – depending on the percentage of AAUs committed to auctioning and their price:

- \$9 billion: assumes 2% of total AAUs are auctioned at \$30 per ton of CO₂
- \$35 billion: assumes 5% of total AAUs are auctioned at \$45 per ton of CO₂

In terms of mitigation spectrums, the proposal offers quantitative certainty as emission levels would be set. The proposal is also dynamic as only Annex I (developed countries are committed to emission reductions under Kyoto). The proposal is therefore:

- (QUANTITATIVELY) **CERTAIN**
- (DEVELOPMENT) **DYNAMIC**

With regard to the adaptation spectrums, the incidence of the mechanism is diverse (rather than concentrated) as ultimately the revenue is sourced from government budgets and their taxpayers. Lastly the proposal is international in form. It is therefore:

- **INTERNATIONAL**
- **DIVERSE**

Auctioning of domestic revenue permits: the EU Emission Trading Scheme (ETS)

Under an Emissions Trading Scheme (ETS), governments can auction their national emissions allowances to the private sector as a means to raise revenue – either at a national or regional level. Whilst there are currently no global cap and trade auctioning schemes (such as the international AAU proposal previously introduced), some national/regional schemes do already exist. These include Switzerland, Australia and Canada for example. Here we

assess the EU ETS, which came into effect in 2005 and now accounts for 80% of global trading (Kapoor et al, 2010).

Today the EU-ETS covers nearly half of the region's total emissions from a range of sectors (for example power and heat generation, iron and steel and oil refining). However the potential revenue of this scheme is yet to be realised, as too few permits have been sold and too many allocated freely. In the first two phases (2005–2007 and 2008–2013) the auctioning of quotas was limited to 5–10% of member states AAUs, and very few countries actually met this – Germany auctioned 9% and the Netherlands only 4% in phase 2 (ibid. 2010). This has been attributed to country and industry lobbying to maximise their allocation of free AAUs (i.e. the scheme was subject to the domestic revenue problem).

The European Commission (EC) has proposed changes to the EU ETS for the third phase (2013–2020):

- Auctioning of AAUs will become the default allocation rule for sectors not exposed to competition, and phased in gradually for others.
- An EU-wide cap will replace the current national cap (this could help eliminate the domestic revenue problem).
- Emissions from all domestic and international flights that arrive at or depart from an EU airport will be covered by the EU ETS, with 15% of allowances auctioned.

With these changes in place, the EC expects that on average 50% of the total AAUs will be auctioned. Assuming a price of €30 and a cap on EU-ETS allowances at 1.72 billion tons of CO₂ in 2020, the market would raise €26 billion annually by 2020. An additional €1 billion per year would be raised with the inclusion of aviation.

Under the proposal EU member states have expressed a 'willingness to use' at least 50% of auction proceeds *'to enable and finance actions to mitigate and adapt to climate change in developing countries.'*³² And so, with the inclusion of aviation, the EU-ETS could raise €14.5 billion annually for international climate finance (\$20 billion³³).

Referring to our mitigation spectrum, the proposal offers quantitative certainty as an EU-wide emissions cap would be set. The proposal is also dynamic (with regard to development) as 12% of the total allowances auctioned will be re-distributed to Member States with lower GDP in the interests of solidarity – these are mostly the newer eastern Member States (DECC, 2010). The EU-ETS third phase proposal is therefore:

- (QUANTITATIVELY) **CERTAIN**
- (DEVELOPMENT) **DYNAMIC**

In terms of our two adaptation spectrums: changes set to be introduced in the third phase will mean that carbon permits will now be auctioned at the EU rather than domestic level. It is also diverse – covering emissions from a range of sectors. The proposal is therefore also:

- **INTERNATIONAL**
- **DIVERSE**

32 Note of Council of European Union, Brussels, 12 December 2008 (re:17215/08) clause 8 on voluntary pre-allocation of part of auctioning revenues acknowledges with respect to member states: *'their willingness to use at least half of [auction revenues] for actions to reduce greenhouse gas emissions, mitigate and adapt to climate change, for measures to avoid deforestation, to develop renewable energies, energy efficiency as well as other technologies contributing to the transition to a safe and sustainable low-carbon economy, including through capacity building, technology transfers, research and development... In the context of an international agreement on climate change in Copenhagen in 2009, and for those that wish to do so, part of this amount will be used to enable and finance actions to mitigate and adapt to climate change in developing countries...'*

33 <http://www.xe.com>. Calculated 28th November 2011.

2.4 Applying the first-order criteria set

We apply the scoring approach from the original *Assessing the Alternatives* report, which is briefly reintroduced. In order to compare the proposals, a broad scoring system is employed. For each criterion, mechanisms are assigned to one of three points on a scale of 0.0 to 1.0: 0.0 (zero score), 0.5 (intermediate score) and 1.0 (high score).

SUFFICIENCY As argued so far, financing climate mitigation and adaptation in developing countries will cost in the region of \$100 billion a year. However, we recognise that no one mechanism is likely to generate this large sum. Instead, a package of different initiatives will be required, which collectively can build towards the amount needed. In this regard, we identify a ‘**sufficiency threshold**’ to be a minimum of **\$25 billion per annum**. A mechanism that raises this level of revenue would receive a high score of 1.0. For mechanisms with very little revenue-raising potential a zero score is assigned, while proposals that would generate a meaningful quantity – more than \$5 billion per annum – receive an intermediate score of 0.5.

EQUITY We assess the extent to which the national allocation of financing matches the Adaptation Financing Index (AFI – see Box 3)³⁴ with a score of 1.0 denoting a fully equitable approach, 0.0 for proposals that would be inequitable, and a 0.5 score for intermediate mechanisms.

BOX 3 The ‘Adaptation Financing Index’

The ‘Adaptation Financing Index’ (AFI) is a measure of a country’s responsibility to pay. It is based on cumulative CO₂ emissions since 1992 on a per capita basis. It only includes countries scoring more than 0.90 in the Human Development Index, thus excluding large developing economies such as China, India, Brazil and Russia (thus taking into account capacity to pay)

According to the AFI index, responsibility distribution is as follows:

USA	44%	Australia	3%
Europe	32%	Korea	2%
Japan	13%	Other	2%
Canada	4%		

PREDICTABILITY For predictability, a 0.0 score represents complete unpredictability, 1.0 for full predictability and 0.5 for intermediate or uncertain outcomes. Here we assume an intermediate score of 0.5 for mechanisms subject to the ‘domestic revenue problem’ and internationally focused mechanisms, in contrast, receive a high score of 1.0.

ADDITIONALITY A funding source that is clearly new and additional receives a high score of 1.0, while those that would be based on existing ODA budgets, for example, would receive a 0.0 score. Where there is some uncertainty in this respect, an intermediate 0.5 score results.

VERIFIABILITY We assume that mechanisms administered by dedicated international agencies are fully verifiable (i.e. 1.0) while those channelled through national budgets are less so (0.5).

³⁴ It is important to note that there are various measures of responsibility. In this paper we do not seek to establish a definitive framework, however the AFI has been selected for this assessment as it takes into account both responsibility and ability to pay.

We recognise that there is inevitably a subjective element involved in any scoring system. Complex numerical evaluation has been deliberately avoided. All criteria are weighted equally, with no order of importance. Subsequently the final scores are plainly indicative. However the purpose of this paper is primarily to enable a better understanding of the various financing proposals on the table, helping us to identify their strengths and weaknesses.

China + G-77

SUFFICIENCY The Chinese proposal to earmark 0.5–1% of developed country GDP for adaptation and mitigation would raise between \$222 and \$444 billion annually (based on 2011 figures). Consequently, the proposal has the potential to at least match the target \$100 billion adaptation figure, assuming a high enough proportion of funds were allocated to these purposes. It therefore receives a high score of 1.0.

PREDICTABILITY Revenues would be channelled through national budget agencies and so subject to the ‘domestic revenue’ problem. As a result an intermediate score of 0.5 is assigned for predictability.

EQUITY A strong feature of this proposal is its equitable nature as a country’s GDP is a good indicator of both its responsibility for creating carbon emissions and its capacity to meet international obligations. Consequently, a high score of 1.0 is assigned.

ADDITIONALITY As the revenue would come from national budgets, the proposal could be viewed as ODA, leading to a reduction in other aid flows and so may not necessarily be additional finance. However, the proposal explicitly states that these funds should be new and additional therefore we assign a score of 1.0.

VERIFIABILITY Revenues would be channelled through national budgetary agencies, which is not as verifiable as international mechanisms, and consequently an intermediate score of 0.5 is allocated.

General carbon tax

SUFFICIENCY The proposed tax would raise \$10 billion a year. This is a reasonable sum and therefore receives an intermediate score of 0.5 for sufficiency.

PREDICTABILITY As the tax would be collected by national agencies it would be subject to the ‘domestic revenue problem’ – it therefore receives an intermediate score of 0.5.

EQUITY Considering that developing countries are exempt from the proposed tax, and that finance contributions will be directly proportional to the level of carbon emissions of developed countries – the proposal would closely match the Adaptation Financing Index. Nevertheless, a general carbon tax could be regressive in that it disproportionately affects the poorest within the country in which it is applied. Taking this issue into account, a general carbon tax is therefore assigned an intermediate score of 0.5 in terms of equity.

ADDITIONALITY Revenue from a carbon tax would clearly be a new and additional source, it therefore scores 1.0.

VERIFIABILITY As an essentially national funding mechanism, the carbon tax receives an intermediate score of 0.5.

Taxing carbon emissions from shipping

SUFFICIENCY Taxing maritime emissions would generate \$10 billion annually by 2020, a little less than half of the \$25 billion target for a high score and therefore receives an intermediate score of 0.5.

PREDICTABILITY As an international mechanism, where revenue collection is not dependent upon national agencies, the proposal receives a high score of 1.0 for predictability. Furthermore the maritime sector has low price elasticity (Birdsall and Leo, 2011); therefore a tax would have marginal impact on overall maritime trade.

EQUITY The proposed compensatory rebate system would ensure that developing economies (i.e. those with a low ADI index – who have neither the capacity nor responsibility to pay for climate activities) are not adversely impacted. The proposal therefore receives a high score of 1.0 on grounds of equity.

ADDITIONALITY Emissions from global shipping are currently unregulated. This means any revenue raised would clearly be new and additional. This therefore receives a high score of 1.0.

VERIFIABILITY Should the tax be administered by the International Maritime Organisation (IMO), the proposal would be fully verifiable and therefore receives a high score of 1.0.³⁵

Taxing carbon emissions from aviation

SUFFICIENCY The proposed tax would generate \$6 billion a year and therefore receives an intermediate score of 0.5 for sufficiency.

PREDICTABILITY Similar to the previous proposal, as an international mechanism where revenue collection is not dependent upon national agencies, the proposal receives a high score of 1.0 for predictability. Again the aviation sector has low price elasticity (Birdsall and Leo, 2011); therefore a tax would have marginal impact on overall travel.

EQUITY By exempting flights between developing countries (and half of those made to and from developed countries), little incidence will be borne by economies with a low AFI index. It therefore receives a high score of 1.0.

ADDITIONALITY This proposal is for a new financing mechanism, therefore it receives a high score of 1.0 for additionality.

VERIFIABILITY Whilst not specified in the proposal, the tax could be administered by the International Civil Aviation Organization (ICAO) – the UN agency globally responsible for establishing standards, recommended practices and guidance on various aspects of international aviation, including environmental protection. Considering the uncertainties in the ICAO's role, the proposal receives a 0.5 for verifiability.

Financial Transaction Tax (FTT)

SUFFICIENCY As argued earlier, revenues derived from international mechanisms (e.g. currencies) could be used to fund global 'goods' (such as climate activities). Based on this argument, annual revenue raised for climate mitigation and adaptation would be \$34 billion. The proposal therefore receives a high score of 1.0 for sufficiency.

³⁵ This however is not explicitly stated in the proposal, and therefore to a degree is an assumption.

PREDICTABILITY This is dependent on the type of FTT implemented. For example a tax on domestic transactions would be channelled through national budget agencies and therefore subject to the domestic revenue problem. However a tax can be designed in such a way that it avoids these risks – i.e. a levy on currency trades with the tax collected at the supra-national level would clearly be international in nature. Considering these uncertainties an FTT receives an intermediate score of 0.5 for predictability.

EQUITY A strong feature of any FTT is its equitable features. For example, global patterns of foreign exchange map very closely onto the AFI framework as described in Box 3 on page 29 (see Table 3). The FTT therefore receives a high score of 1.0 for equity.

ADDITIONALITY This revenue source is clearly new and additional, and therefore receives a high score of 1.0.

VERIFIABILITY Depending on the type of FTT implemented and how it is designed, the tax might be channelled through national budgetary agencies. In such a case the revenue would not be as inherently verifiable as international mechanisms. Consequently the proposal is assigned an intermediate score of 0.5 for verifiability.

TABLE 3 AFI vs Global FX weightings

Country/region	AFI weight	Global FX Weight
USA	44	44.5
Europe	32	27
Japan	13	10.3
Canada	4	2.3
Australia	3	2.6
Korea	2	1

Redirecting fossil fuel subsidies

SUFFICIENCY If fossil fuel subsidies in Annex I countries were phased out, \$6.5 billion could be raised annually. The proposal therefore receives an intermediate score of 0.5.

PREDICTABILITY As the revenue raised would be subject to the ‘domestic revenue’ problem, the proposal receives an intermediate score of 0.5.

EQUITY With developed countries (which have the responsibility and capacity to pay) taking the lead on subsidy removal, the proposal closely mirrors the AFI. For example, according to the AFI the US is responsible for 44% (the majority) of climate finance. As the proposal suggests the US would contribute \$10 billion, which is more than any other country. It therefore receives a high score of 1.0.

ADDITIONALITY As an example of redirecting revenues, the proposal is clearly a new and additional source of finance. It therefore receives a high score of 1.0.

VERIFIABILITY Because the revenue would be channelled through national budgets, not through an international agency, the proposal is given an intermediate score of 0.5.

Special Drawing Rights (SDRs)

SUFFICIENCY A \$100 billion initial capital injection of SDRs could mobilise \$7 billion in climate finance annually, it therefore receives an intermediate score of 0.5. However it should be noted that if new and regular SDR allocations were agreed (as proposed by Action Aid), the amount of climate finance raised could be much higher.

PREDICTABILITY With \$7 billion of finance being raised annually, alongside the IMF issuing regular and new SDR allocations, the proposal would provide a predictable source of climate finance. However, in any given year, the volume of funds could alter depending on interest rates. It subsequently gets an intermediate score of 0.5 for predictability.

EQUITY As SDRs are allocated in proportion to IMF country quotas, developed countries (with the capacity and responsibility to pay) would contribute the majority to climate finance. The AFI index is reflected by IMF country quotas, with the US holding 17.7% of the total – far more than any individual country (IMF, 2011b). The proposal therefore receives a high score of 1.0 on grounds of equity.

ADDITIONALITY The fact that using SDRs for climate finance is an example of redirecting revenues, it receives a high score of 1.0 in terms of a new and additional source of finance.

VERIFIABILITY Revenue would be channelled through national budgetary agencies, as such it is not as verifiable as via international mechanisms. Consequently an intermediate score of 0.5 is assigned.

The International auctioning of national carbon emission permits (or ‘assigned amount units’ – AAUs)

SUFFICIENCY Depending on the percentage of AAUs auctioned (and at what price) the proposal could generate \$9–35 billion annually. We measure sufficiency against the lower estimate as \$35 billion is based on a carbon price of \$45 per ton, significantly higher than any other proposal (including the AGF) and is therefore somewhat unrealistic. Nevertheless \$9 billion is a significant sum and therefore receives an intermediate score of 0.5.

PREDICTABILITY As one of the few purely international mechanisms, where revenue collection is not dependent upon national agencies, the AAU proposal receives a high score of 1.0 for predictability.

EQUITY A levy applied to Annex I countries subject to international emission reduction targets would be broadly equitable, assuming that national allocations approximated to acceptable notions of international responsibility and capacity. Also the proposal assumes all Annex I countries – including the US – would participate in the auction. It therefore adheres to the AFI in terms of a country’s responsibility to pay. The AAU proposal thus receives a high score of 1.0 for equity.

ADDITIONALITY This revenue source is clearly new and additional, and therefore receives a high score of 1.0.

VERIFIABILITY As a pure international mechanism, a high score of 1.0 is assigned.

Auctioning of domestic revenue permits: the EU Emission Trading Scheme (ETS)

SUFFICIENCY The third phase of the EU-ETS has the potential to raise up to \$20 billion annually by 2020 for climate activities. The proposal therefore receives an intermediate score of 0.5. However over time this could increase with a) a higher percentage auctioning, b) a greater proportion earmarked for climate finance and c) an increase in carbon price.

PREDICTABILITY The European Commission has determined that auction revenue should accrue to individual Member States. As revenue raised in the ETS would be collected by national agencies, a mechanism to allocate these revenues for international purposes would need to be established to enable them to become a reliable and predictable source. The proposal therefore receives an intermediate score of 0.5.

EQUITY A levy applied to auctioning carbon permits in the EU is equitable in the sense that European countries have considerable responsibility for historical emissions, and the capacity to meet these obligations. That said, in the absence of similarly equitable contributions from other parties – particularly the United States – this is at best partial. The proposal therefore receives an intermediate score of 0.5.

ADDITIONALITY This revenue source is clearly new and additional, and therefore receives a high score of 1.0.

VERIFIABILITY As an essentially national funding mechanism, the ETS receives an intermediate 0.5 score for this criterion.

TABLE 4 Applying the first-order criteria set

	Sufficiency	Predictability	Equity	Additionality	Verifiability	TOTAL
AAUs	0.5	1.0	1.0	1.0	1.0	4.5
Tax on shipping	0.5	1.0	1.0	1.0	1.0	4.5
Tax on aviation	0.5	1.0	1.0	1.0	0.5	4.0
Financial Transactions Tax	1.0	0.5	1.0	1.0	0.5	4.0
China + G-77	1.0	0.5	1.0	1.0	0.5	4.0
Special Drawing Rights	0.5	0.5	1.0	1.0	0.5	3.5
Removal of fossil fuel subsidies	0.5	0.5	1.0	1.0	0.5	3.5
EU-ETS	0.5	0.5	0.5	1.0	0.5	3.0
General carbon tax	0.5	0.5	0.5	1.0	0.5	3.0

As we can see, the highest ranking proposals are the international AAU and a tax on carbon emissions from shipping – both receiving a total score of 4.5 out of a possible 5. At the lower end is a general carbon tax on aviation emissions and the EU ETS (both with a total score of 3.0). These two proposals are subsequently omitted from further assessment at this stage. We are now left with seven filtered proposals to be considered in relation to our ‘second-order’ criteria.

TABLE 5 Filtered proposals

AAUs	4.5
Tax on shipping	4.5
Tax on aviation	4.0
Financial Transactions Tax	4.0
China + G-77	4.0
Special Drawing Rights	3.5
Removal of fossil fuel subsidies	3.5

2.5 Assessing the mechanisms against the second-order criteria set

As with the first-order criteria, we score each remaining proposal as 0.0 (zero), 0.5 (intermediate) or 1.0 (high) against the three second-order criteria:

EFFICIENCY This entails the economic costs or lack of them that would be associated with the proposal, with contributing factors including transactions costs and possible market distortions.

EASE OF IMPLEMENTATION We consider a) whether the mechanism builds on existing institutions and infrastructure, b) whether it builds on existing international agreements or requires fresh negotiations, and c) the speed with which the mechanism could be introduced. A zero on all elements leads to the lowest score (0.0), a mixed outcome leads to an intermediate score (0.5), while a high on all fronts leads to a high score (1.0).

CO-BENEFITS For co-benefits, we consider both developmental implications and compatibility with a comprehensive global deal on mitigation. This reviews both positive and negative aspects with intermediate proposals receiving a score of 0.5.

The International auctioning of national carbon emission permits (or ‘assigned amount units’ – AAUs)

EFFICIENCY The proposal scores a maximum of 1.0 on efficiency grounds, as it is non-distortionary and, while absolute transaction costs are relatively high, the additional or marginal transaction costs will be low because the necessary infrastructure would already be in place.

IMPLEMENTATION The AAU proposal receives an intermediate score of 0.5. Whilst the institutions and infrastructure already exists, its implementation would depend upon reaching

new international agreements on what proportion of AAUs are auctioned and also on directing the revenue to climate finance.

CO-BENEFITS The proposal receives a high score of 1.0 in terms of co-benefits as it would create, by putting a price on 'permits to pollute', incentives to shift to a low-carbon economy.

Taxing carbon emissions from shipping

EFFICIENCY The proposal receives an intermediate score of 0.5 because, whilst minimal, taxing emissions from shipping will increase import and export costs therefore having a distorting effect on international trade.

IMPLEMENTATION Pre-existing levy mechanisms (e.g. departures fee etc) and institutions (the IMO) indicate that shipping levies are feasible, could be implemented quickly and would require relatively modest administrative expenses as the necessary infrastructure already exists (Birdsall and Leo, 2011). The proposal therefore receives a high score of 1.0.

CO-BENEFITS The mechanism scores positively for sustainable development benefits (in that it creates an incentive to reduce emissions from international shipping) and the proposed rebate system would ensure that any tax on shipping will not be borne by developing countries (in terms of increased import costs and international trade). It therefore receives a high score of 1.0.

Taxing carbon emissions from aviation

EFFICIENCY Whilst the aviation sector has a relatively low price elasticity of demand, a tax on aviation emissions might, for example, have an impact on the tourism industry - especially in the current economic climate (Birdsall and Leo, 2011). Subsequently the proposal receives an intermediate score of 0.5.

IMPLEMENTATION Pre-existing levy mechanisms (e.g. the Air Passenger Duty is already paid by a number of countries including the UK) and institutions (the ICAO) indicate that taxing aviation emissions is technically feasible, could be implemented quickly and would require relatively modest administrative expenses - as the necessary infrastructure already exists (Birdsall and Leo, 2011). The proposal therefore receives a high score of 1.0.

CO-BENEFITS The mechanism scores positively for sustainable development benefits (in that it creates an incentive to reduce emissions from the aviation sector) and by excluding flights between developing countries from the proposed tax, the principles of common but differentiated principles are upheld and any potential costs of the tax would not be borne by developing countries. The proposal therefore receives a high score of 1.0.

Financial Transaction Tax (FTT)

EFFICIENCY An FTT would be non-distortionary in that very low rates would be applied. In addition, transaction costs would be low as the process could be automated. This leads to a high score of 1.0.

IMPLEMENTATION The automation of financial transactions means that the infrastructure needed for an FTT already exist; it is therefore technically feasible and would be inexpensive to implement. The many unilateral FTTs already established (such as the UK Stamp Duty) are illustrative of this point. However a multilateral FTT would require fresh negotiations

and agreements, and there is currently political opposition for such a tax in a number of countries. Subsequently the proposal receives an intermediate score of 0.5.

CO-BENEFITS While unconnected with the issue of climate change, an FTT has the potential to bring broader developmental benefits by reducing market volatility³⁶ through enhancing economic stability. Such a mechanism would neither help nor hinder a global deal on mitigation – the proposal therefore receives an intermediate score of 0.5 for co-benefits.

Redirecting fossil fuel subsidies

EFFICIENCY Removing fossil fuel subsidies would be highly economically efficient. It would free up substantial amounts of public funds and correct market distortions in fossil fuel prices by ‘internalising environmental externalities’. The proposal therefore receives a high score of 1.0.

IMPLEMENTATION Current commitments to phase out fossil fuel subsidies remain vague and still require negotiation, it would also be a lengthy process (up to 7 years for Annex I countries to remove all subsidies). The proposal therefore receives a zero score of 0.0.

CO-BENEFITS The removal of fossil fuel subsidies would create an incentive for the energy sector to invest in cleaner technology and put us on a path to a low-carbon economy. Also by differentiating the removal of subsidies according to time and by country income level, the development path of the poorest countries will not be affected. The proposal therefore receives a high score of 1.0.

Special Drawing Rights (SDRs)

EFFICIENCY According to the proposal, total world GDP is estimated at US\$60 trillion. A one off issuance of \$100 billion into the economy in order to generate annual payments would have no distortional impacts or lead to inflation (Action Aid, 2010). The proposal therefore receives a high score of 1.0 for efficiency.

IMPLEMENTATION Issuing SDRs is a relatively easy and quick process. Indeed in 2009, in response to the economic crisis, \$250 billion worth of SDRs were issued in less than five months. However using SDRs for climate finance faces major political obstacles; in particular there is strong opposition from the US. With the US holding a higher IMF quota than any other single country, this represents a major block to the use of SDRs to climate finance. The proposal therefore receives an intermediate score of 0.5 when considering the ease of implementation.

CO-BENEFITS The proposal has no clear benefits in terms of sustainable development and would neither help nor hinder a global deal on mitigation. Therefore an intermediate score of 0.5 is assigned.

China + G-77

EFFICIENCY The Chinese proposal scores highly for efficiency because of its simplicity (0.5% of GDP), but less so in that this is only applied to Annex I countries and so would have distortionary implications. As a result, an intermediate score of 0.5 is assigned.

³⁶ Even a very low rate FTT is likely to reduce High Frequency Algorithmic trading, see ‘Rise of the Machines’ (Richard Gower, 2011 – <http://www.oxfamblogs.org/fp2p/?p=6979>).

IMPLEMENTATION While the proposal would not require a new and dedicated structure to collect the funds generated, as national agencies would perform this function, there would be a need for a dedicated international body to manage these funds. Beyond this, however, the obstacles to negotiating such a historically unprecedented straight transfer of revenues from North to South are extreme, especially given today’s economic climate. This is demonstrated by the great difficulty in getting countries even to honour their pledges to earmark 0.7% of GDP to international development. Considering these significant political problems, a zero score of 0.0 is assigned.

CO-BENEFITS The Chinese proposal has no clear co-benefits in terms of sustainable development. While the proposal may not be fully compatible with certain forms of global deal such as a global cap and trade system, it would be compatible with a UNFCCC mechanism financed directly through national budgets. As a result, an intermediate score of 0.5 is assigned.

TABLE 6 Applying the second-order criteria set

	Efficiency	Implementation	Co-benefits	TOTAL
AAUs	1.0	0.5	1.0	2.5
Tax on shipping	0.5	1.0	1.0	2.5
Tax on aviation	0.5	1.0	1.0	2.5
Financial Transaction Tax	1.0	0.5	0.5	2.0
Removal of fossil fuel subsidies	1.0	0.0	1.0	2.0
Special Drawing Rights	1.0	0.5	0.5	2.0
China + G-77	0.5	0.0	0.5	1.5

2.6 Ranking the proposals

TABLE 7 Combined first- and second-order criteria

	First order	Second order	TOTAL
AAUs	4.5	2.5	7.0
Tax on shipping	4.5	2.5	7.0
Tax on aviation	4.0	2.5	6.5
Financial Transaction Tax	4.0	2.0	6.0
Removal of fossil fuel subsidies	3.5	2.0	5.5
Special Drawing Rights	3.5	2.0	5.5
China + G-77	4.0	1.0	5.0

As already emphasised, these scores are indicative rather than definitive. They are intended to do no more than give a sense of the relative attractiveness of the financing mechanisms.

2.6.1 Recommendation

Employing the preceding analysis, viewed across a range of criteria, the 'international AAU' and 'tax on shipping emissions' proposals both rank the highest as potential mechanisms to fund climate activities in developing countries.

The AAU mechanism would generate \$9 billion annually, assuming 2% of total AAUs are auctioned at \$30 per ton of CO₂. Of course this figure could be even higher should a greater percentage be allocated for auctioning, and at a higher price. The AAU mechanism was also situated at the preferred ends of the mitigation and adaptation spectrums. When considering the former the proposal offers **quantitative certainty** and is **dynamic**. In terms of the latter it is **international** and **diverse**. To supplement the revenue generated, a tax on international shipping would raise an additional \$10 billion a year. As the mechanism focuses on one sector it is situated at the **concentrated** end of the adaptation spectrum, and is therefore at risk of being undermined over time (through lobbying for example). Nevertheless it is also **international** in nature and therefore would avoid the 'domestic revenue' problem associated with other mechanisms.

Between them, the AAU and shipping tax could raise a total of \$19 billion a year – this is far short of the \$100 billion target we have identified. Therefore further mechanisms are needed to complete a 'portfolio' of approaches to funding climate activities, and so we turn to the next ranking proposals.

A tax on carbon emissions from the aviation sector could raise an additional \$6 billion a year, and an FTT that was focused on its most inter-nationally traded asset, foreign exchange, could raise a further \$34 billion a year. This could be supplemented by using SDRs to leverage \$7 billion of new private finance annually. Additionally, \$6.5 billion a year could be raised (on average) by redirecting developed country fossil fuel subsidies.

This combination of finance mechanisms would raise \$72.5 billion a year to help fund mitigation and adaptation activities. Whilst this is short of the \$100 billion target, it is not the purpose of this paper to deliver a final and definitive conclusion to the current funding gap. Instead we have set out to create a tool-kit to help stakeholders better assess how the challenge can be met.

PART 3 Conclusion

In this paper we have considered the framework required for mitigation to be achieved and examined proposals for how both mitigation and adaptation in developing countries could be financed. We conclude with a recommendation of a cluster of mechanisms that could generate between them \$72.5 billion a year in revenue. However, we emphasise that the role of this paper has been more concerned with developing a way of thinking about the issues inherent to climate change financing; as well, to articulate principles and criteria upon which current and future proposals can be assessed.

Mitigation

Estimates of the cost of mitigation vary hugely, and start from \$78 billion a year (IPCC, 2007). This may be a huge sum but it is dwarfed by estimates of the cost of failing to act, both in economic and in human terms.

To shift to a sustainable, low-carbon trajectory we argue that either the quantity of global emissions can be restricted, or the costs of these emissions can be increased to achieve the same result. In policy terms these two options equate to a global limit, or 'cap', with national allocations and some form of trading; or to a global carbon tax with redistributive transfers.

Although a global cap may be the best means of ensuring that global emissions remain within scientifically determined levels, such an approach is fraught with political difficulty. Developing countries argue with good reason that they should not be constrained by any restriction of this kind as this would in effect penalise them for problems created by the developed world (which should sharply reduce its own emissions before asking anything of the developing world).

The ability of developed countries to agree emission reductions (based on a fair and equal deal in terms of allocation, i.e. not 'grandfathering') post-Kyoto would significantly increase the chances of developing countries joining any form of a global cap. Should this be achieved, one advantage of a 'cap and trade' arrangement would be that it would require rich countries, which were allocated far fewer permits than they needed, to purchase the surplus permits held by poorer countries, where current emissions would be below their allocations. As a result, much of the vast annual transfers needed to fund mitigation in developing countries would be 'hard-wired' into the system.

However, for a variety of reasons, it may be that neither developing nor developed countries will accept a cap which would mean looking at other options. For a comprehensive alternative to quantitative limits on emissions one would have to examine a global carbon tax of some kind. While this would not bring the same certainty as a cap, it may still be extremely effective. A problem, however, is that there are no North-South transfers 'hardwired' into such a system, which would mean being reliant on the redistribution of tax revenues from the developed to the developing world to fund mitigation. To accommodate this, it would be essential to establish a clear and binding (insofar as this would be possible) framework for redistribution.

Adaptation

The science is clear: the process of industrialisation in the developed world has caused the concentration of greenhouse gases in the atmosphere to steadily increase. By the middle

of 2008 CO₂ equivalent concentration levels had reached 420ppm. If we are to avoid irreversible and catastrophic climate change we need to urgently decarbonise our global economy to help reduce and stabilise CO₂ levels.

Whatever happens, we still will need to adapt to the climate change that is already 'in the system', the impacts of which are being felt hardest by the least able to cope: the poorest countries and people who have little or no responsibility for creating the environmental crisis. Therefore it is developed countries that need to shoulder the burden of dealing with it.

Indeed, not only do developed countries face a clear moral obligation to finance the costs of adaptation in developing countries, they have already accepted this as signatories to the UN Framework Convention on Climate Change (UNFCCC) where this obligation is explicit in terms of the principles of 'common but differentiated responsibility'.

As with mitigation estimates, the volume of finance required to fund adaptation vary considerably, anywhere up to \$100 billion a year.

Findings

Our assessment has been based on current developed country pledges of \$100 billion a year to fund climate mitigation and adaptation activities in developing countries. To put this in perspective, this sum is about one sixteenth of the world's current military expenditure.

We assessed nine prospective financing mechanisms on three occasions through different lenses in order to familiarise ourselves with the proposals assessing them against such factors as sufficiency, predictability, equity, additionality, efficiency and ease of implementation.

At the end of this process we identified a portfolio of mechanisms that between them could generate substantial revenue:

- **The International auctioning of national carbon emission permits (the AAU proposal)** would raise \$9 billion pa.
- **Taxing carbon emissions from shipping:** \$10 billion pa.
- **Financial Transaction Tax (FTT)**, particularly focused on the taxing of currency transactions: \$34 billion pa.
- **Redirecting fossil fuel subsidies:** \$6.5 billion (on average) pa.
- **Special Drawing Rights (SDRs):** \$7 billion pa.

Together these mechanisms could generate \$72.5 billion a year to finance climate adaptation and mitigation activities in developing countries.

Beyond \$100 billion

Although our primary focus in this paper has been to assess options to reach the \$100 billion per annum that has been committed to, we argued in section 2.1 (page 14) that the real target is likely to be closer to \$200 billion. When considering how this larger figure might be reached over the longer term it is important to highlight the wider potential of Financial Transaction Taxes (FTTs).

In the section on the FTT (2.3.2) a revenue estimate of \$75 billion (€57 billion) from the taxation of financial transactions in the EU has been suggested by the European Commission in draft legislation. The EC study is the most detailed that has been carried out on the

potential impact and revenues resulting from a comprehensive FTT. If we employ the same assumptions and extend this approach to other developed economies, the total potential revenues from a domestic FTT across all developed economies in 2011 would be around \$262 billion. Given the conservative nature of the EC's assumptions, not least with respect to the impact on derivative trading, this can be seen as providing a minimum estimate. The EC proposal also excluded currencies. Consequently, if we include the estimated \$34 billion (Leading Group, 2010) from the international CTT, the figure rises to \$297 billion.

TABLE 8 Potential FTT revenue forecast in US\$ billions (based on IMF World Economic Outlook figures)

	2011	2012	2013	2014	2015
FTT Developed economies	296.53	308.57	321.38	335.04	349.15
FTT Developed (ex currencies)	262.53	272.64	283.38	294.81	306.55
CTT	34.00	35.93	38.00	40.23	42.60

The size of the funding challenge is large. Future funding sources will have to be equally so. These estimates suggest that, not only could the international arm of an FTT contribute significantly towards the initial \$100 billion target, but also that a broader FTT is one of the few potential mechanisms that could begin to address the larger total that will ultimately be required.

Closing remarks

In the final analysis, the main purpose of this paper is to provide a tool to better get to know the financing proposals currently on the table. We have set out, therefore, to assist in the navigation of what to many are still new and yet uncharted waters. However, the need to make advances in the field of mitigation and adaptation finance has reached a critical juncture. Time is not on our side. In the end, it will be political intention and feasibility that determine whether some or any of the instruments will be adopted. Yet the requirement is so great and the cost of failure so immense, that we hope this paper may in some way assist with that decision-making.

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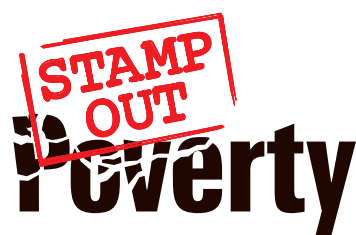
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