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Grantham Research Institute on Climate Change and the Environment

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Delivering climate finance: principles and practice for funding the Fund

Mattia Romani and Nicholas Stern *

1. Introduction and Context

The world must go through an energy-industrial transformation in the next few decades if it is to manage responsibly the immense risks of climate change. It must reduce the absolute level of global emissions of greenhouse gases (GHGs) by a factor of 2½ or more in 40 years and emissions per unit of output by a factor of 7 to 8 under reasonable growth assumptions; that is what is needed to give a 50-50 chance of holding to a 2 deg C increase in global temperatures relative to the 19th century. That will require substantial investment in both developed and developing countries and major technological advance. Failure to cut emissions on this kind of scale would result in serious risks of temperature increases of 3,4,5 deg C and higher. These temperatures would likely transform the relationship between humans and the planet: we have not seen 3 deg C for 3 million years and 5 deg C for 30 million years – homo sapiens has been around for approximately 200,000 years.

The rich countries are not only wealthier and better equipped technologically than developing countries but they also emitted around 75% of cumulative global GHG emissions since the mid-19th century. The anthropogenic climate change which is occurring now and will occur over the next 20 years, which is largely the result of these past emissions of rich countries, will also require substantial investment in adaptation.

For these reasons an equitable climate change agreement must involve substantial support by the rich countries for the mitigation and adaptation investment which is necessary in poorer countries. The conclusions of the UNFCCC COPs held in Durban in December 2011, and in Cancun in 2010, point in this direction: action on reducing emissions will need to be taken globally, but poorer countries need to be assured, through financial support, of equal access to sustainable development.

The arithmetic is clear. The current total global emissions are nearing 50Gt CO2 equivalent (CO2e) p.a., with approximately 20Gt CO2e p.a. in the rich world and the remaining 30 Gt CO2e in the developing world.[1] Taking into account the pledges in the Cancun agreement, by 2020 total emissions would be in the 48-52Gt CO2e range, with rich countries 16-19Gt CO2e, and developing countries at 32-33Gt CO2e[2]. If the rich countries accelerated their

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[1] Extrapolated from CAIT-WRI dataset. Including Land-Use Change & Forestry and Intl Bunkers

[2] For a detailed account of these estimates see UNEP. *The Emissions Gap Report*. November 2010.

actions to reduce emissions they could potentially get down to 10Gt CO2e by 2030. If poor countries managed to limit emission increases per capita to modest levels, they may hold their overall per annum emissions to approximately 40Gt CO2e by 2030. This would mean a total global flow of emissions of approximately 50Gt CO2e p.a. by 2030. Scientists tell us that to have a 50-50 chance of holding temperature below 2^0C global emissions would need to be below 35Gt CO2e by 2030.

This brutal arithmetic has two consequences. One, the world needs to raise its game from the Cancun pledges starting now. Second, the rich countries simply cannot deliver enough by emission reductions alone to create the space that the poor countries understandably argue is their right given basic notions of equity and past history of emissions. That surely tells us that support to the developing countries in finance and technology at this vital stage of their fight against poverty is both critical and just. Such support should be major and should be at the heart of a plan to deliver on the Cancun objective of 'equal access to sustainable development'. The concept of sustainable development should surely include the 2^0C target given the dangers the science indicates and the adoption of the target at the UNFCCC in Cancun. It surely does not mean equal access to an environmental train wreck.

Development, mitigation and adaptation are closely intertwined, e.g. adaptation is essentially development in a more hostile climate, and all three should be at the heart of developing countries', and indeed global, policies to manage climate change. Without effective management of climate change efforts to overcome poverty will be derailed.

At the same time, development ambitions such as the Millennium Development Goals (MDGs) and developing countries' long-term objectives were established before the grave dangers of climate change were fully understood by society. The development effort is thus more challenging than was anticipated when those objectives were set. In these circumstances it is important that provision of climate finance should be over and above the long-standing commitments to development finance. That is the notion of "additionality".

These arguments drove the logic behind the inclusion in the Copenhagen Accord of December 2009 (UNFCCC, COP15) of the provision of a flow of $100 billion p.a. from developed countries to developing countries for climate finance. There are arguments for much larger sums (see below) but this would represent a significant start. The funds in the Accord were to be designated part public and part private, as much of the investment in the transformation process will come from the private sector. The equity case sketched above provides a strong argument for funds being grants and public, since private flows require repayment and come with other obligations. However, without this phrase "public and private" there would have been no Copenhagen Accord and no Cancun Agreement (COP16 of UNFCCC) in December 2010, an agreement which essentially brought the Copenhagen Accord into the UNFCCC.

The process that brought the outcomes of Copenhagen and Cancun started in December 2007 at COP13 in Bali. The impending economic crisis was not generally foreseen at this time. In December 2009, in Copenhagen, many thought that coordinated action would overcome the economic problems fairly rapidly. However, we now recognise that our economic systems are undergoing a profound and lengthy crisis, involving major macroeconomic structural imbalances (large surpluses and deficits in the international macroeconomic system), major debt and deficits in some countries and severe strains in the Eurozone; the prospects for growth are fragile. The macroeconomic imbalances mean that over the last 10-15 years immense capital flows have been going in the wrong direction—from developing and emerging markets to the advanced industrial countries—rather than taking advantage of opportunities for sound investment, low-carbon and climate-resilient investment, which would promote sustainable economic growth and poverty reduction in the developing world. Prior to the crisis there was a growing consensus that far more effective ways of deploying the world's savings were required, given the enormous needs for investments to promote development and to respond to the challenge of climate change. Financing investment in developing countries, and indeed the efforts to generate substantial finance for low-carbon technologies in the context of the COP process, should thus be seen not only as part of an equitable agreement, but also as part of a move to a more sound and efficient global allocation of investment, which could also contribute to a more stable long-run macroeconomic framework.

An important outcome of the COP process was the establishment of the Green Climate Fund, Part of the Durban Platform for Enhanced Action, the purpose of which is to provide a delivery vehicle for mitigation and adaptation finance. But where will the resources to fund the Fund come from?

The High-Level Advisory Group on Climate Finance (AGF), established by the UN Secretary General after Copenhagen, worked during 2010 to produce a set of proposals on sources for this funding. The AGF report[3] was published in October 2010 and proposed a funding package based on a collection of sources. It has been followed by a number of documents and reports over the past year. A few of these papers have explored in more detail some of the potential sources of finance suggested in the AGF report, providing some important quantification and assessing practicality.[4] Most have fallen short, though, of placing at the heart of their analysis the strong set of sound economic principles that is at the core of the AGF report. In our view, the AGF report offers the most coherent, well-founded and developed package now available for

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[3] See : http://www.un.org/wcm/content/site/climatechange/pages/financeadvisorygroup

[4] See for instance World Bank (2011). Mobilizing Climate Finance. Washington DC (http://climatechange.worldbank.org/content/mobilizing-climate-finance , in particular Annex 3 by the OECD, on fossil fuel subsidies) and Houser, Trevor and Jason Selfe (2011). Delivering on US Climate Finance Commitments, Working Paper 11-19, Peterson Institute for International Economics, Washington DC (http://www.iie.com/publications/interstitial.cfm?ResearchID=1992)

"funding the Fund" and accordingly in this paper we set out their logic and provide an assessment one year on from publication.

The funds raised following the principles of the AGF report would not necessarily flow entirely through the Green Climate Fund. Decisions on how to channel new funds would presumably be taken by potential providers and recipients of funds.

What is needed is a reliable and principle-based bundle of sources of finance, involving both public and private instruments that can be scaled up according to the adaptation and mitigation financing needs of developing countries, in the context of their development plans and programmes. And they should provide incentives for production and consumption around the world consistent with the overall move to the low-carbon economy. Little has been done since the AGF report was issued in terms of securing such solid financial foundation to the Green Fund. Because it takes time to build the crucial elements of taxation based on economic principles, in particular in relation to the GHG externalities, we need to start now. We should recognize that in the interim there will need to be initial financial flows based on existing sources.

The Durban Platform re-establishes the importance of identifying such sources of finance and sets clearly the challenge of building towards this finance over the coming years. We must fund the Fund.

2. Existing trends in financial flows

Recent research indicates that current flows of climate finance are significant and are likely to continue increasing strongly over the next decade. A recent report by the Climate Policy Initiative (CPI) suggests that flows to developing countries supporting low-carbon development activities are currently close to $100 billion per annum.[5] Out of the estimated $97 billion approximately $55 billion is private sector investment, while approximately $21 billion is public grants, and the rest is mostly bilateral and multilateral institutions' lending instruments. Carbon markets are a very small share of the total, less than $2 billion. Private funding is in the form of direct equity and debt into capital investment, partially generated as a result of the leverage of bilateral and multilateral banks. The importance of the necessary transformation is increasingly recognised and the process of change is under way, albeit far too slowly to achieve a reasonable chance of holding to a 2 degree increase, without substantial acceleration.

A majority of the world's growth in the next decade is likely to be in the developing countries and thus a change in the nature of that investment towards low-carbon is critically important. Developed countries must move rapidly too

[5] Based on a review of existing climate finance data available. While sources differ in their timing, data mostly relate to 2009 and 2010.

– they have a responsibility to provide examples and to develop and share technology, given their high current and past emissions per capita, their wealth and their access to technology.

Investment in low-carbon infrastructure around the world has increased substantially over the last decade and, after a slow down at the climax of the global financial crisis in 2009, they have continued to rise strongly. According to a recent report by UNEP/Bloomberg New Energy Finance, the investment in renewable energy in developing countries increased, on average, by more than 50% a year between 2004 and 2010, and 10% a year over the last 3 years despite the crisis.[6] If similar rates of increase were to continue over the next 10 years, and taking the estimates by CPI as a guideline, overall private sector investment to developing countries in low-carbon or adaptation activities would far exceed the $200 billion figure estimated by the AGF.

These numbers may mislead the reader into believing that the $100 billion pledge is easy to achieve or, indeed, has already been achieved. This is not the case. While the current flow of funds to low-carbon activities in the developing world may be close to $100 billion, this does not mean that the Copenhagen pledge has been met. First, the pledge is for *additional* funds, and thus arising as a result of policy action by rich countries to promote flows; most of the current flows of $100 billion pre-date the pledge. Current flows are also not *incremental* in their nature, i.e. they represent the full capital investment, not the additional cost of low-carbon infrastructure vis-à-vis traditional infrastructure. Finally they constitute overall gross flows, i.e. including the full amount of loans that carry obligations for repayment; they are not in this sense net contributions.

The figures mentioned above indicate, however, that there already exist significant flows of climate finance to developing countries. There is a process under way which can be and should be accelerated. We should note that the $100 billion pledge constitutes only a small part of what the flows will have to be over the next decades. These numbers underline the size and scale of the opportunity. Action to protecting forests, while reducing the emission from deforestation, is already underway in several countries and is proving to be an opportunity to generate growth from the forests themselves.[7] Investors are increasingly realizing that the future of economic growth is in the low-carbon economy and are investing accordingly. They have also recognized the strong actions and policy that many developing countries governments are taking to lay the foundations for low-carbon growth in their economies.

There is much that developed countries can do through public action to help accelerate these flows. Measures include in particular support by multilateral

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[6] *Global Trends In Renewable Energy Investment - Analysis of Trends and Issues in the Financing of Renewable Energy*. UNEP, 2011.

[7] See for instance the work carried out by Brazil and Indonesia in indentifying alternative economic growth opportunities in forests (see www.gggi.org for a summary of the analysis).

and bilateral institutions for policies in developing countries which can foster investment and financial measures that can help share and reduce risk. Indeed the involvement of multilateral institutions in the investment can itself reduce risk and attract private capitals.

In this context, while relatively small, the pledge of $100 billion in the Copenhagen Accord is of great importance. It is crucial to support developing countries in this transition, particularly by creating mechanisms to leverage private investment, including by managing and reducing risk, and by investing in the adaptation needs of a changing climate, particularly in small states that would otherwise struggle attracting investment.

3. Funding the Fund

3.1 The principles

Sound policy should be based on clear principles. Broadly they should: present additional resources on the necessary scale, and thus take account of both the size of the base for taxation and political acceptability; foster effective and efficient incentives for the transition to a low-carbon economy; and involve both private and public investment. These can be translated in this context into the following:

i. *Taxing the bad*. Sources should contribute to tackling the problem, i.e. taxing for the damage from emissions and thus correcting the market failure associated with the GHG externality and promoting efficiency.

ii. *Additionality as new-ness or innovative finance*. The Copenhagen Accord indicates that the $100 billion p.a. should be 'new and additional'. Some clarity on this concept is essential but it is not easy to be precise. One cannot say with any confidence what investment or development flows to developing countries would have been in 2020 if we had not thought about climate change. For the purposes of identifying the contributions to the $100 billion p.a. from each source and potential ranges, the AGF adopted a conceptual approach based on *new-ness* of sources, rather than attempting to work with a rigid, and inevitably somewhat arbitrary, definition of 'additionality' relative to a reference case. This corresponds in large measure to the motivation in the Accord considering new and innovative sources of finance which go beyond those which would otherwise have been used.

iii. *Incidence on rich countries*. The measures considered to raise finance should have no net incidence implications for developing countries if they are to constitute net flow from developed to developing countries. This has two implications: first, sources of finance that have incidence on developed countries only should be preferred (e.g. revenues from carbon taxes or cap-and-trade auctions in the context of the commitments made by developed countries to reduce their emissions); second, if sources of finance have a direct or indirect incidence effect on developing countries, these should be compensated

accordingly; for example, if a tax on international aviation is introduced, flights between developing countries should be either exempt or compensated, from a perspective of flows going from developed to developing countries. One would hope however that developing countries would themselves put a price on or regulate such emissions, since the damage from emissions is independent of their source.

iv. *Promoting public and private sources*. While private sources will take the lion's share in terms of financing the capital needed for the new energy and industrial revolution, public funds will also be required for many activities. These include mitigation investments that are unlikely to attract sufficient private finance because of associated market failures, for example those involving R&D or the building of networks, risk-sharing instruments to leverage private investments (e.g. debt guarantees, first-loss equity, etc) and those adaptation investments unlikely to attract private finance.

v. *Scalability and robustness*. There is uncertainty about the necessary scale of climate action. This implies that the bundle of financial sources chosen to fund the Fund will need to be scalable and thus the base of taxation should be substantial so that rates are not too high. The bundle should be flexible, both to put the Fund in a position to fund strong action and to deliver different combinations of grants and loans depending on the mix of investment and its finance that is required. Recent research on the scale of required adaptation investment indicates that, on their own, they are larger than the full $100 billion specified in the Copenhagen Accord.[8]

vi. *Raising domestic revenues in developed countries*. Sources of climate finance considered here have the potential to raise substantial public finance, some of which could be available to meet domestic (not necessarily climate-related) fiscal requirements. This is particularly important during the current period of especially severe fiscal pressures in many developed countries, when governments look at opportunities to increase revenues through efficient taxation. The magnitude of these opportunities will depend on the circumstances and choices of individual countries and on the acceptability of earmarking of the selected instruments, but both the AGF Report and subsequent analysis estimate total government revenues to be in the hundreds of billions of dollars. [9]

Further, the package of instruments adopted should carry two types of consistency. They should be mutually reinforcing and not contradictory.

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[8] See for instance Fankhauser, Sam (2010). *The Costs of Adaptation*. Wiley Interdisciplinary Reviews: climate change, v.1. World Bank (2010) *EACC Synthesis Report*, Washington DC. UNDP (2008) *Human Development Report: Fighting Climate Change*, New York.

[9] The World Bank estimates a revenue base of $250 billion p.a. from carbon pricing, of 22 billion for taxation on international transport, and of 40-60 billion from the removal of fossil fuel subsidies. For a more detailed breakdown of total revenues see World Bank (2011). Mobilizing Climate Finance. Washington DC

Second they should be at an intensity which is at least consistent with the Cancun ambitions and capable of being strengthened as ambitions strengthen.

The distinction between *'net'* and *'gross'* definition of flows is of great importance in understanding the nature of support which the flows embody. A private sector loan at market rates for low-carbon investment does not increase the net resources available to a country. The same is true of a public-sector loan at market rates. In contrast direct contributions such as aid (whether from public or philanthropic sources) without repayment obligations which are over and above existing commitments do in fact increase the overall net resources available to that country. So do concessional loans, which do carry a repayment obligation, but implicitly have a 'grant equivalent' value depending on the nature of their concessionary element. An increase in the gross flow, i.e. the total value of the loans and grants, is of interest as it is an indication of the overall activity in this area which is being financed. And the innovation and scale of new types of investment carry important information and learning about future opportunities and the overall direction of the economy.

Thus public/private and net/gross are relevant distinctions and none should be dismissed. But there should be special emphasis on net increases. Perhaps unsurprisingly, developing countries focus on the net-public combination of sources when looking at climate finance flows. This derives from the fact that there is a powerful equity argument for a high share of public funds in the $100 billion pledge. Many developing countries can already borrow at reasonable market rates but need additional resources to leverage private investment to the scale required for the radical change involved in moving to a low-carbon economy.

The political acceptability the origin and use of such financial flows, both from the perspective of developing and developed countries, could involve a number of issues of public confidence. It will influence their potential size, growth over time, and uncertainty of revenues. We will discuss this later in the paper.

3.2 Sources

The AGF examined the attractiveness of 'bundles' of financial sources, i.e. combinations of sources, against the six criteria above. It sought bundles with elements that are mutually supportive and consistent.

There are several important advantages to taking a 'bundle or package approach'. A range of sources allows countries flexibility in choosing domestic sources according to countries' preferences. Such an approach allows for the spreading of the risks associated with individual sources not delivering the expected flows and hence makes overall flows more reliable. Different sources can reinforce each other. For example risk-sharing instruments through International Financial Institution (IFI) will be more effective in leveraging investment if carbon pricing instruments are in place, strengthening arguments for their joint inclusion in any package or bundle. Some sources will overlap with each other, and there would be arguments for a direct choice between

them. The overall revenue potential of a bundle, therefore, is not necessarily the sum of its parts. It is in particular the dynamic relationship between the sources, and the potential for mutual reinforcement in the wider context of a move towards a low-carbon economy, that matters here. The portfolio approach pursued by the AGF Report attempts to move the debate on sources from picking individual sources in isolation, "a menu approach" to reliable, self-reinforcing bundles of sources that both benefit from and contribute to laying the foundations for the low-carbon economy.

The individual sources that can constitute the components of the bundles have been described extensively both by the AGF report and in subsequent literature. In summary, the sources examined were as follows:

1) Public finance

- Revenues from the international auctioning of emission allowances (such as assigned amount units (AAU) under the Kyoto Protocol): this would involve retaining some allowances from developed countries and then auctioning them to raise revenues;
- Revenues from the auctioning of emission allowances in domestic emissions trading schemes: this would involve the auctioning of domestic credits (as in the European Union Emission Trading System phase III) and allocating some part of associated revenues;
- Revenues from offset levies: this would involve withholding a share of offset revenues as a global source, as currently done in the Clean Development Mechanism (CDM);
- Revenues generated from taxes on international aviation and shipping: this would either involve some levy on maritime bunker/aviation jet fuels for international voyages or a separate emissions trading scheme for these activities, or a levy on passenger tickets of international flights; it is inefficient and distortionary to leave these externalities untaxed;
- Revenues from a wires charge: this involves a small charge on electricity generation, either on kWh produced or linked to carbon emissions per kWh produced; some of these measures may lead to double-taxation if applied together with carbon related taxes;
- Revenues generated by removing fossil energy subsidies in developed countries: this comprises budget commitments freed by the removal of fossil energy subsidies, part of which can be diverted towards climate finance. It should be noted that hydrocarbon subsidies in developing countries are worth hundreds of billions of dollars p.a., wasting precious revenues and distorting incentives. But these are matters for developing countries to decide;

- Revenues from fossil fuel extraction royalties/licences: these could be allocated in part to international climate finance;
- Revenues from carbon taxes: this is based on a tax on carbon emissions in developed countries raised on a per-ton-emitted basis;
- Revenues from a financial transaction tax: this builds on existing proposals on a global financial transaction tax (with a focus on foreign exchange transactions). Concerns were raised as such a tax is motivated by the externality arising from financial market volatility rather than the externality of greenhouse gases and is, depending on the design, international in its basis;
- Direct budget contributions: this involves revenues provided through national budgetary decisions;

2) Development bank instruments:

- Resources generated via multilateral development banks using current balance sheet headroom;
- Resources created via potential further replenishments and paid-in capital contributions by countries to multilateral development banks (i.e., generating new cash resources for multilateral development banks). These could support both highly concessional IDA-type loans and non-concessional loans;
- Potential contribution to a fund dedicated to climate-related investment financed on the back of commitment of existing or new Special Drawing Rights of the IMF;

3) Carbon market finance

This refers to transfers of resources related to purchases of offsets in developing countries. Carbon markets offer important opportunities for directly financing new technologies in developing countries, and for leveraging private investment. Presently, the majority of resources are generated via private entities and governments in developed countries purchasing project-based offsets from private entities in developing countries through the CDM. Additional flows could be generated when and if carbon markets are further developed and deepened. The potential scale of resources is dependent on the stringency of the emissions reduction commitments of developed countries, and thus on carbon-market prices, on carbon market design and on the availability of eligible emissions reductions in developing countries.

4) Private capital flows

The relevant flows are those arriving from international private finance resulting from specific interventions by developed countries. The interventions include the use of risk mitigation or

revenue-enhancing instruments that compensate private investors for otherwise lower than risk-related required rates of return (also referred to as "crowding in") as well as capacity-building for adaptation and implementation of climate policies in developing countries. Such flows cannot be committed ex ante, since they depend on private choices; however, developed country policy actions, as well as the multilateral and bilateral development banks, can catalyse and foster additional private sector flows.

The following table gives an estimation of the potential gross revenue that could be generated from the individual sources.[10]

Table 1: Assessment of revenue potential for international climate of individual sources

2020 estimates, $ billion	Low carbon price ($15)	Medium carbon price ($25)	High carbon price ($50)
Public finance sources			
AAU/ETS auctions	2-8	8-38 (25-50)*	14-70
Offset levies	0-1	1-5	3-15
International transport: Maritime and Aviation	3-8	6-11 (7-11)*	11-25
Carbon tax (other than auctions of assigned amount units and emissions trading schemes)	Approximately 10 for every $1/t		
Wires charge	5 for a charge of $0.0004/kWh or $1/t of CO2e		
Removal of fossil subsidies	3-8 (4-12)*		
Redirection of fossil royalties	Approximately 10		
Financial transaction tax	2-27		
Contributions from IFIs			
IFIs	For each 10 in capital replenishment, ~30-40 in gross MDB lending		
Private finance sources			
Carbon market offsets	8-12	38-50 (20)*	150

[10] Based on AGF analysis and on WB Mobilizing Climate Finance paper. See Appendix 1 for the overview of assumptions

Private finance	Up to 200 billion, generated with a leverage factor of 2-4 on public flows/carbon market offsets. (100-200*

** Estimates in parenthesis are from World Bank (2011). Mobilizing Climate Finance. Washington DC*

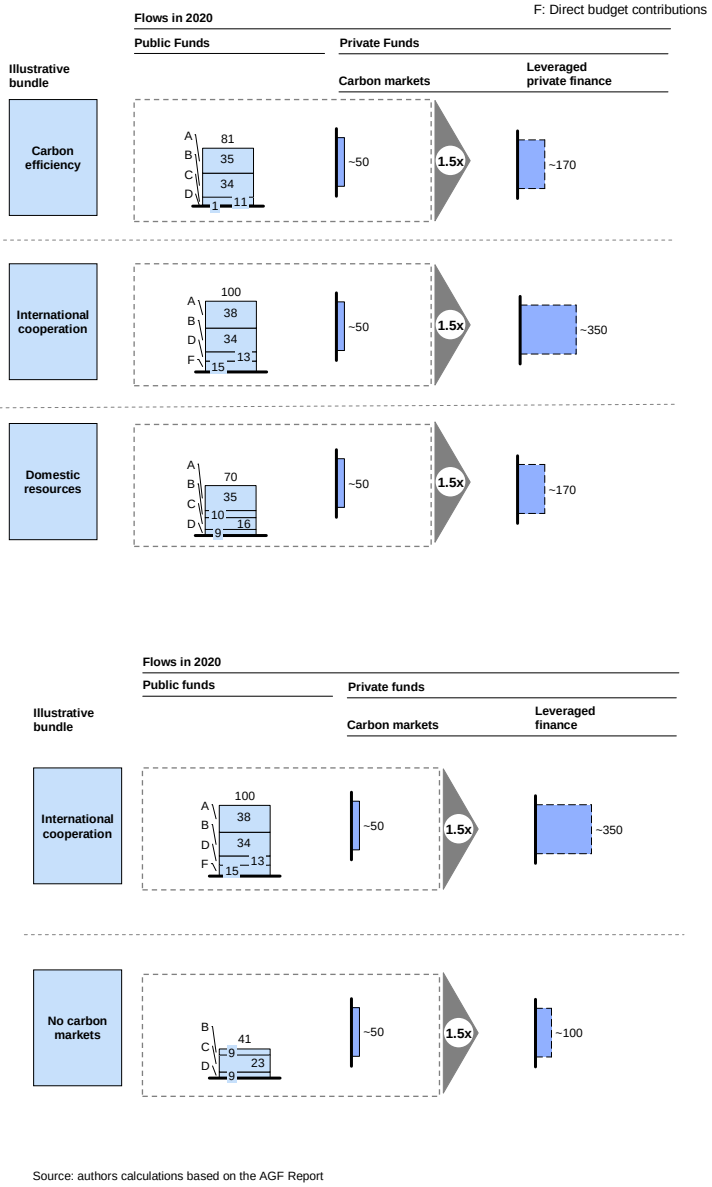
Note: The figures in this table refer to the flows available for international climate finance using AGF and World Bank assumptions. A substantial amount of revenues, not accounted for in this table, would be retained in national budgets. For example, the AGF assumes that 90% of auction revenues and 50-75% of travel would be retained domestically

What emerges clearly from the analysis of individual sources is that none of them, on their own, would be sufficient to provide the required flows to meet the $100 billion commitment. This is yet another reason to prefer a portfolio or package approach to funding the Fund. Bundles of sources can be built based on different governing principles by including these public and private sources based on their match to such principles, in particular by giving special weight to one or some of the six principles described above. For example, a bundle can be built around the principle of promoting 'carbon efficiency', i.e. prioritizing the use of sources that are directly related to carbon and apply a tax to the "bad", such as revenues from carbon taxes, from auctioning and carbon markets. Alternatively, bundles could be created following a principle of non-dependence on carbon markets if, for instance, we want to ensure the reliability of the flows in the absence or weakness of carbon markets. Or bundles can be based on strong international cooperation, if the political conditions allow it. Such a bundle may include a larger share of revenue generated through an international transport tax, with a substantial part of funds being channelled through MDBs. Alternatively, one can envisage a domestic-focused bundle that relies on domestic measures, such as revenues from carbon taxes/wire charges, or from auctioning permits. Some of the analysis carried out in the context of the AGF indicated that not all of these bundles would have the same potential in terms of raising revenues. In particular bundles based on carbon pricing in a context where there was little appetite for taxing emissions, or for international coordination of carbon markets and taxing international transport, would fall short of meeting the $100 billion p.a. commitment.

Illustration of potential combinations

$ Billions

A: Carbon market public revenues
B: International transport
C: Carbon related revenues
D: IFIs
E: Financial transactions tax
F: Direct budget contributions



Source: authors calculations based on the AGF Report

The examples of bundles in figure 1 illustrate some potential combinations that would suit different preferences and scenarios. Crucially, not all of them would generate the same amount of public and private flows or of net and gross flows.

This type of analysis, looking at the combined characteristics of different combinations, is of great importance in generating reliable and principled financial foundations for climate finance on the scale required, including for the GCF. Simple public finance principles – such as the ones used in the AGF to examine the individual sources (revenue potential, efficiency, incidence,

practicality, reliability, additionality, political acceptability) can serve as sensible principles to examine different potential bundles.

A bundle of sources built around the principle of carbon efficiency, making use of the revenues generated through carbon markets and by taxing emissions, seems to be a particularly attractive option, particularly when associated with some international cooperation. The middle price of $25 per tonne of CO_2 is probably a lower bound on the 2020 price which could be consistent with delivering on the Cancun pledges.

Even assuming the majority of revenues being retained domestically, the mix of instruments in such a bundle could deliver[11]:

- approximately $30 billion p.a. in net public funds from the emissions trading/taxing, depending on the level of ambition and commitment of developed countries

- approximately $30 billion p.a. in net public funds from taxing international transport and removing fossil fuel subsidies

- approximately $20 billion p.a. in gross flows in the form of loans from IFIs, by investing an additional $5 billion p.a. to their capital

- approximately $250-300 billion a year in gross private flows generated by using the leverage potential of public funds

Such a bundle would leave substantial funds in national treasuries (amounting to $150-200 billion globally). It would build on the self-reinforcing nature of its different components and contribute to the transition to a more efficient and sustainable low-carbon economy.

3.3 An assessment of potential sources and bundles according to the proposed principles

It is clear, assessing different bundles and sources, that those built on charges for the emission-related externality, consistent with an efficiency perspective, are preferable in principle, They are, though, largely dependent on the political willingness of individual countries to have a carbon market or some other mechanism to tax the externality on the back of strong emission reduction commitments. Without such political commitment there is little left in terms of individual sources that meet the principles laid out in this paper. In the absence of such commitment, attention would have to shift to alternative or existing sources if the financial commitment is to be narrowed.

There are some signals of such political commitment are more and more evident, both in developed and in developing countries. The EU, as made clear by the negotiations in Durban, continues its commitment to creating a strong

[11] The estimates for this bundle are based on the AGF Report analysis and on the subsequent analysis by the World Bank on taxation of international transport and removal of fossil fuel subsidies.

carbon market, and Australia has recently announced it will go down this route. Korea and Brazil are both considering the introduction of a cap and trade scheme, and several provinces in China are moving to implement markets as an experimental step towards a national structure. The strength of these markets will depend on the strength of commitment and of the underlying economies – the EU ETS price is lower during slow growth or recession since the number of permits is not speedily adjusted for falling overall demand and supply in the economy.

The risk mitigation and management roles of the involvement of the international financial institutions reinforces the incentive effects based on carbon-prices in motivating private and public investment. Thus overall, we have reinforcement and interval consisting of the package and the elements within it.

We should recognize also that political will is basic to any of the measures. Such a will is more likely to exist the greater the recognition of the climate challenge, the greater the recognition of an international sense of community, the greater the recognition of the attractions of a low-carbon path and the greater the conviction resources will be spent wisely.

The package we have set out is a package and not a menu. the revenues at the end of section 3.2 above are consistent with the middle price in Table 1 of 825 per tonne of CO2e. That is probably a lower bound for carbon prices in 2020 if the Cancun pledges are to be realised. In this sense it is consistent with the overall Cancun package. There is an urgent need, both to generate action and to help international agreement, to show clear commitment to be on the path to generate $100 billion a year by 2020. The work-programme on long-term finance agreed in the Durban Platform crucially covers the 2012-2020 period as well as post-2020 sources. This means finding ways to start ramping up sources now, to reach the full committed amount by 2020. Both investment and agreement require a tangible sign of good will and commitment to make things happen on the ground. Many of the sources and bundles indentified by the AGF could be scaled up relatively quickly. In particular, public sources which build on existing domestic revenue-generating instruments could be ramped-up earlier, depending on political commitment and on the extent to which governments would dedicate resources collected through these mechanisms to international finance. We should not underestimate the power of early action and good examples in generating such political willingness and acceptability of the proposed packages.

The AGF report identified *acceptability* as a fundamental principle of sourcing climate finance. This concept should include, from the perspectives of both developed and developing countries, confidence that the monies will be spent wisely in terms of productivity and integrity. From this perspective it should combine the willingness to provide resources and the willingness to receive them on the terms offered. Acceptability should also include confidence that appropriate mechanisms would be in place so that those developing countries

taking climate action have a prominent role in shaping spending decisions. A further aspect of acceptability, again from the perspective of both developed and developing countries, includes confidence that a priority for the resources be for those who are poorest and most vulnerable.

Developing countries making their plans would be greatly helped by predictability in the potential scale and nature of funding. The ability to make an ex-ante assessment of flows (in particular regarding additionality and the relationship between development aid and climate finance) is crucial for examining reliability as countries plan their strategies around development, adaptation and mitigation. The issue is partly one of political acceptability for developing countries, but also and in particular of efficiency: without both clarity and reliability on timing and magnitude of financial flows it would be very difficult for developing countries to lay the long-term foundations for resilient low-carbon growth. Good financial planning is at the very core of spending wisely and effectively, and therefore related to acceptability for developed countries as well. The governments of both developed and developing countries are accountable for the efficient spending of resources to their tax-payers, citizens and voters.

4. Conclusions

Funding is crucial to a global agreement, and a global agreement of some kind is crucial for reducing the risks of climate change. There is unlikely to be a global agreement without a clear commitment on funding. This is why it is imperative not to kick the debate about sources of finance into the long grass. The Durban Platform has created a framework where substantial progress can be made over the next 12 months in terms of raising the necessary revenues or funding the Fund.

The debate must recognize the difficult global context of the next few years, in terms of the diversion of attention of senior leaders due to financial crises, pressures to reduce their public spending, and macroeconomic imbalances. On the latter, taking action on climate and using public finance to foster the rechanneling of global investment to low-carbon infrastructure could be part of the necessary transition to rechanneling world savings to productive investments that make our economies stronger.

The crisis risks making us short-sighted: climate action should accelerate now. Building revenue takes time in the best of circumstances and crises do not last forever. We should take a 10 year view on the political conditions and the general economic environment. These considerations should affect our view of when carbon financing sources would be available.

This is the basis of the context in which we need to identify a technically feasible and politically acceptable solution to fund the Green Climate Fund. In our view, some clear principles should govern our thoughts in the search for the right combination of sources:

i. Sources should not only raise money, they should foster the transition to the low-carbon economy. It is therefore important that they create the right incentives to support resource allocation to low-carbon technologies and adaptation activities. Prioritizing instruments that raise revenues from charging for the externality seems to be a good way of achieving this.

ii. Sources need to be new and innovative. This seems to be a good way of interpreting additionality in this context.

iii. Incidence of the taxes used to mobilize funds should be limited to developed countries. If there is an impact on developing countries, they should be compensated accordingly.

iv. The role of the private sector is crucial to the transition. Public sources should be combined with private not only to leverage investment as much as possible, but also to structure risk, influence policy, and generate a business environment which is conducive to private investors. Given the extensive experience of the IFIs in this sector, this gives them a particularly important role.

v. We live in an uncertain world and we recognize that the balance across countries and instruments will vary over time. This is one more good reason to take a portfolio approach to sources and instruments. Flexible bundles will increase the reliability of the financial flows and reduce their vulnerability to circumstances. The world is uncertain also in terms of the scale of needs over time, both for low-carbon investment and for adaptation. Portfolios should be designed with flexibility to scale up resources if and when needed.

vi. Many of the sources of finance considered as potential sources for the Green Climate Fund could produce substantial sums for national treasuries. Based on the calculations of the AGF and of the World Bank analysis for the G20, these are estimated in several hundreds of millions p.a. from introducing carbon pricing and associated markets, and several tens of billions p.a. from fossil fuel subsidies reforms and international transportation taxations.[12]

These principles and observations lead quickly to identifying a set of potential individual instruments that can be combined to form flexible, scalable bundles of public and private financial sources for climate action:

- Public finance: $50-80 billion in net public revenues can be raised from a mix of AAU/ETS auctions and offset levies ($25-50 billion p.a. depending on the ambition), taxes on international transport (approximately $10 billion), removal of fossil subsidies (approximately $10 billion), redirection of fossil royalties (approximately $10 billion). Other sources such as other carbon taxes, wires charges, and a financial transactions tax could also contribute. And, as

[12] For a more detailed breakdown of total revenues see World Bank (2011). Mobilizing Climate Finance. Washington DC

mentioned above, this would be possible while retaining the majority of revenues from these sources in domestic treasuries.

- IFIs contributions: $30-40 billion of leveraged gross public lending for every 10 billion of public money invested in an IFI

- Private finance: $200-300 billion in gross private flows from carbon markets and private investment, leveraged by public funds

Many of these individual sources are realistic and have the potential to meet the commitment through flexible bundles. These numbers are calculated on the basis of an assessment of developed countries' commitment to reducing emission by charging for them. They assume some willingness to tax international transport and to channel those revenues to climate investment. And they assume willingness to remove fossil fuel subsidies that distort investment in our economies and use the resources freed for climate finance. These are strong assumptions, which sometimes require taking the long view to seem credible. But admitting defeat in mobilizing these resources on the basis of short-termism would be a mistake: whilst the mechanisms are being built for a carbon based system other ways may need to be found over next few years to start funding the fund, perhaps focusing on the role of IFIs and general government revenue.

Money is unlikely to flow to a new fund unless there is a clear sense that these funds will be spent wisely. Examples are needed of how such funds can be effective in promoting low-carbon infrastructure in developing countries and in making their economies resilient to inevitable climate change. It is encouraging that many such examples exist already and that robust, coherent green growth plans are being carefully devised by many developing countries.

Both the finances and the investment will take time to emerge: they have to be built in a coherent and measured way. The Durban Platform has opened the door to make some significant progress over the next 12 months. Thus we must "get on with it now", using the recovery from this crisis to lay the foundations for the next decade of low-carbon growth and recognize that during this vital decade it will be necessary to generate flows from existing source of finance. We cannot postpone the planning and taking of action until the current crisis is over.

Appendix 1

Overview of assumptions based on AGF analysis (calculation based on a $25/t carbon price)

International auctioning of emission allowances and auction of allowances in domestic emission trading schemes (AAU/ETS auctions)

- Total market size approximated by forecast developed country emissions of 15 Gt CO2e by 2020
- Assumption that 2-10% of total market size would be auctioned and earmarked for international climate finance

Carbon price in medium scenario of $25/t equates to market size of $375 billion, 2-10% auctioning provides a total of $8-38 billion in revenues

Offset levies

- Assumes levy of 2-10% on offset market transactions
- Offset market size assumed at 1.5-2 Gt CO2e in medium scenario, or $37.5-50 billion at an estimated carbon price of $25/t
- Total levy amounts to 2-10% of $37.5-50 billion or $1-5 billion

International Transport

Maritime
- Assumes 0.9-1 Gt CO2e of emissions, priced at a $25/t price of carbon (captured through auctions or levies) equivalent to $22.5-25 billion
- Subtracting developing country incidence estimated at 30% and estimating that of the remainder, 25-50% could be used for international climate finance, leads to total estimate of $4-9 billion

Aviation
- Assumes total passenger and freight emissions in 2020 of 800 Mt of which 250 Mt are in scope (excluding intra EU flights and developing country incidence)
- Total revenue pool at carbon price of $25/t on 250 Mt equates to $6 billion
- Assuming 25-50% of these revenues can be earmarked for climate finance delivers estimate of $2-3 billion

Carbon related revenues (other than AAU/ETS auctions)

Carbon Tax
- Calculates that $1 of tax on 11-13 Gt CO2e of energy related emissions translates roughly into $10 billion of revenues; assumes 100% used for international climate finance

Wires charge

- Calculated that power sector emissions priced at $1/t tax on CO2 on 4.7 Gt CO2e of power generated emissions in OECD countries resulting in total of $5 billion of revenues; assumes 100% used for climate finance
- Equivalent to wires charge of $0.0004/kWh on ~12,000 TWh of power generated in OECD countries in 2020

Removal of fossil subsidies

- Fossil fuel subsidies estimated at up to $8 billion in Annex 2 countries within G20; assumes 100% used for climate finance
- Redirection of fossil royalties. Estimated at billions to tens of billions of US dollars based on survey of self-reported receipts of five key oil producing developed countries

Financial Transaction Tax

- Assumes $3000 billion of trading per day through the CLS times 255 trading days results in total trading volume of ~$756 trillion
- Assumes tax rate of 0.001%-0.01% and reduction in volume of 3-6% for 0.001% tax, and 21-37 % for 0.01% tax rate which translates into revenues of $7-60 billion
- Assumes 8,5 % compensation for developing country incidence based on share of transactions and use of 25-50% of total revenues for climate change which translates into $2-27 billion

Contributions from IFIs

- Additional replenishment provided by developed countries only, no incidence on developing countries.
- For gross lending, leverage factor of $3-4 per $1 of paid in to capital/replenishment based on existing capital structures

Carbon Markets offsets

- Assumes offset price of US$25/t on 1.5-2 Gt CO2e of offset flows. This would require a high level of mitigation ambition in developed countries, with correspondingly tight caps;
- A net estimate of carbon market offset flows (medium carbon price) would be in the range of US$8-US$14 billion per year, depending on transaction costs.

Private finance

- Generated with a leverage factor of 2-4 on public flows/carbon market offsets