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Delivering on US Climate Finance Commitments

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Abstract

At the United Nations climate change conference in Copenhagen in 2009 and Cancun in 2010, the United States joined other developed countries in pledging to mobilize \$100 billion in public and private sector funding to help developing countries reduce greenhouse gas emissions and adapt to a warmer world. With a challenging US fiscal outlook and the failure of cap-and-trade legislation in the US Congress, America's ability to meet this pledge is increasingly in doubt. This paper identifies, quantifies and assesses the politics of a range of potential US sources of climate finance. It finds that raising new public funds for climate finance will be extremely challenging in the current fiscal environment and that many of the politically attractive alternatives are not realistically available absent a domestic cap-and-trade program or other regime for pricing carbon. Washington's best hope is to use limited public funds to leverage private sector investment through bilateral credit agencies and multilateral development banks.

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And today I'd like to announce that, in the context of a strong accord in which all major economies stand behind meaningful mitigation actions and provide full transparency as to their implementation, the United States is prepared to work with other countries toward a goal of jointly mobilizing \$100 billion a year by 2020 to address the climate change needs of developing countries. We expect this funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance. This will include a significant focus on forestry and adaptation, particularly, again I repeat, for the poorest and most vulnerable among us.

—Hillary Clinton
December 17, 2009

INTRODUCTION

Those remarks by the US Secretary of State during the 2009 UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP15) in Copenhagen marked a turning point in the negotiations taking place in the Danish capital. During the first ten days of the two-week conference, the talks had made almost no progress. Developed countries wanted to replace the 1997 Kyoto Protocol with a new agreement that included emission reduction commitments both from the United States and major emerging economies. Major emerging economies were reluctant to take on such commitments and insisted on an extension of the Kyoto Protocol with a side agreement for the United States. For the more vulnerable developing countries (least developed countries (LDCs) and island states), the Kyoto Protocol left a lot to be desired.¹ But without a credible and sufficiently attractive alternative on the table, they backed their richer developing world peers in pressing for its extension.

Secretary Clinton's announcement changed that calculus. While less than many developing countries had hoped for, the prospect of \$100 billion in financing for mitigation (reducing emissions) and adaptation (adjusting to a warmer world) was an offer worth considering. In fact, one day before Clinton's announcement, Ethiopian President Meles Zenawi indicated that \$100 billion could be an acceptable figure (Eilperin and Fahrenthold 2009). With that amount now on the table, many vulnerable countries saw enough value to work towards a new agreement, and press large developing countries to meet Secretary Clinton's condition of a "strong accord in which all major economies stand behind meaningful mitigation actions and provide full transparency as to their implementation" (Clinton 2009).

1. For vulnerable developing countries, the Kyoto Protocol is inadequate both as a tool to halt global temperature increases and as a means of providing the resources necessary to adapt to a warmer world. With emission reduction obligations limited to developed countries, the Kyoto Protocol covers only 29 percent of current global emissions and less than 2 percent of the projected growth in emissions in the next two decades. And the Kyoto Protocol provides 2 percent of the revenue from the Clean Development Mechanism generating \$138 million as of January 2011 plus \$85.6 million in donations. By 2013, the program is projected to raise only \$120 million to \$230 million in additional funds (Adaption Fund 2011).

In the final 24 hours of the conference, a group of roughly 30 heads of state from developed and developing countries alike, including representation from key vulnerable country groupings such as LDCs, the African Group, and the Alliance of Small Island States (AOSIS) negotiated the five-page Copenhagen Accord, which included the following pledge:

In the context of meaningful mitigation actions and transparency on implementation, developed countries commit to a goal of mobilizing jointly USD 100 billion dollars a year by 2020 to address the needs of developing countries. This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance (UNFCCC 2009).

In exchange for that financial support, developed countries won mitigation commitments from developing countries to be listed in the Accord's appendix following the conclusion of the Copenhagen conference, and an agreement to submit reports every two years for international consultation and analysis on their progress in meeting those commitments.

Despite the broad and representative group of countries involved in drafting the Copenhagen Accord, the UN Secretariat and the Danish chair were unable to win support from all 194 parties to the UNFCCC required to formally adopt it. Instead, it was left as a stand-alone agreement for those countries wishing to sign up. By March of 2010, over 100 countries accounting for more than 80 percent of global emissions and 75 percent of global population had associated with the Accord (Houser 2010). Roughly two thirds of those countries had listed specific emission reduction commitments in the Accord's appendixes. While less ambitious than many observers had hoped, with emission reduction commitments from all major emitters and agreement on meaningful amounts of financial support for both mitigation and adaptation, the Copenhagen Accord provided a basis for a truly global approach to climate change.

At COP 16 in Cancún at the end of 2010, a skillful and credible Mexican chair was able to win support for the basic political deal outlined in the Copenhagen Accord from everyone but Bolivia. The Cancún Agreements put meat on the bones of the Copenhagen Accord and were formally adopted at the close of the conference. The 30-page agreement reiterated the Copenhagen Accord financing pledge:

The Conference of the Parties ...

Recognizes that developed country Parties commit, in the context of meaningful mitigation actions and transparency on implementation, to a goal of mobilizing jointly USD 100 billion per year by 2020 to address the needs of developing countries;

Agrees that, in accordance with paragraph 1(e) of the Bali Action Plan, funds provided to developing country Parties may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources (UNFCCC 2010).

It brought over the developed and developing-country mitigation commitments from the Copenhagen Accord's appendixes and began to define the process through which the international community will track countries' progress in implementing those commitments.

Yet while Cancún marked significant progress towards an international climate framework that works for the United States, recent events have cast a cloud over America's ability to live up to its end of the bargain. In the face of rising public opposition and significant Republican gains in Congress in the 2010 election, both President Obama and Senate Democratic leadership walked away from the economy-wide cap-and-trade legislation passed in the House of Representatives in 2009.² Without such legislation, it's unclear whether the United States will be able to meet its 17 percent by 2020 emission reduction target. Even more in doubt is America's ability to deliver its share of the \$100 billion in financing called for in the Cancún Agreements, as significant public and private investment in mitigation and adaptation in developing countries would have resulted from a US cap-and-trade program.

To protect and expand the diplomatic progress the United States has made thus far, Washington will need to demonstrate to the international community it can still meet its Copenhagen and Cancún commitments given the shifting domestic political landscape. A number of analysts have begun exploring the feasibility of achieving a 17 percent reduction in US emissions by 2020 through a combination of energy legislation, federal regulation, and state and regional action (Wagner and Peterson 2010; Orans, Pearl, and Mahone 2010; Ross Morrow et al. 2010; Bianco and Litz 2010; Krupnick et al. 2010). In this piece, we explore ways the United States can deliver on its financing pledge. It's important to emphasize that this pledge is contingent upon the other elements of the Cancún Agreements being implemented. So if developing countries back away from their mitigation or transparency commitments, there is no obligation for the United States to deliver on financing. But the reverse is also true—if the United States is interested in an international approach that includes action from developing as well as developed countries, a credible narrative on how America's share of that \$100 billion gets delivered is required.

The Copenhagen Accord called for the creation of a high-level panel to study potential sources of public and private financing that could help meet the \$100 billion goal. On February 12, 2010 UN Secretary General Ban Ki Moon announced the creation of such a panel, called the High-Level Advisory Group on Climate Change Financing or AGF (United Nations 2009) and on November 5, 2010, the AGF delivered its report. The report identifies potential sources of public and private finance at a global level and assesses them using eight criteria: scale, efficiency, incidence, equity, practicality, acceptability,

2. Responding to questions after the 2010 elections about the future of climate legislation, President Obama said, "cap and trade was just one way of skinning the cat; it was not the only way. It was a means, not an end. And I'm going to be looking for other means to address this problem" (White House 2011a). Similarly, Senator Joe Lieberman, co-author of APA, conceded, "whether we like it or not, cap and trade has no chance of passage in the next Congress" (Bravender 2010).

additionality, and reliability. In this brief we assess the same sources of financing from an American standpoint. We analyze how much could be mobilized from the United States specifically and the prospects of doing so given the current economic and political landscape. This work compliments recent analysis by the Peterson Institute's William Cline on the economic cost of achieving the Copenhagen Accord and Cancún Agreement's stated goal of limiting global temperature increases to 2 degrees Celsius and the amount of international financial support required to achieve that goal (Cline 2011).

We find that the most politically acceptable sources of US climate finance can only be delivered through a cap-and-trade program or carbon tax, neither of which seems likely to be enacted in the United States in the short term. In the absence of market-based US climate legislation, America's best bet is to focus on utilizing the recent capital increases at the Multilateral Development Banks to expand their climate finance work and to ramp up bilateral credit support through the US Export-Import Bank and Overseas Private Investment Corporation. Combined with current levels of climate-related discretionary spending from the federal government, these sources could deliver up to \$25 billion per year in US climate finance by 2020. The problem is they will be largely focused on mitigation, with little funding available for adaptation work. Securing adaptation-appropriate finance will be much more challenging and the best bet, though still politically difficult, is to focus on international aviation and marine transport agreements.

WHAT'S AMERICA'S SHARE?

Before exploring ways the United States might meet its fair share of the \$100 billion goal, we need an idea of what the US fair share should be. This issue wasn't tackled in either Copenhagen or Cancún and there are a range of possible approaches for dividing the burden. The Cancún Agreements state that developed countries commit to the \$100 billion goal, so the first question is: what qualifies as a developed country? The UNFCCC separates countries into those expected to take the lead in reduction emissions and providing financial support for poor and vulnerable countries (listed in Annex I of the Convention) and everyone else. Annex I countries are often referred to as developed countries and non-Annex I countries as developing in climate diplomacy, though not all Annex I countries were considered developed when the convention was signed in 1992.

This list of Annex I countries has remained largely constant over the two decades of the Convention's existence despite the dramatic changes in the global economy that have occurred during that time. Today, more than 30 non-Annex I countries have per capita incomes higher than the bottom third of Annex I countries did in 1992. Of these, the richest 20 have higher incomes than 25 percent of Annex I countries today. For example, Singapore, with per capita income of \$45,000 is a non-Annex I country, while the Ukraine, with per capita income of only \$7000 remains in Annex I. Four of the ten richest countries on earth in per capita terms are non-Annex I (EIU 2011).

If for climate finance purposes, the developed-country designation is limited to the 40 nations currently listed in Annex I, and the \$100 billion pledge is split among them based on 2009 GDP (the year the pledge was made), the US share would be \$36.1 billion (table 1). Expanding the list to include all countries that have per capita incomes today that are higher in inflation-adjusted terms than the income of the bottom fifth of Annex I countries in 1992, would increase the number of developed countries from 40 to 83 (the Updated Annex I—High scenario in table 1).

This would have only a modest impact on the US share of the \$100 billion pledge, however, as most of these newly qualifying countries are not economic heavy weights. Per capita income of the bottom fifth of Annex I countries in 1992 was \$4,900 measured in 2005 dollars. Yet China and India's per capita in 2009 stood at just \$2,700 and \$1,000 respectively (also measured in 2005 dollars). Using this criterion, the US share falls from \$36.1 billion to \$31.1 billion. And as mentioned previously, not all Annex I countries could fairly be considered developed in 1992. Indeed, the Convention generally refers to the group of countries listed in Annex II when discussing who has the responsibility to provide climate finance. Annex II is a list of all Annex I countries, excluding the Former Soviet Union. And the per capita income of the bottom fifth of this group in 1992 was much higher—\$23,400 measured in 2005 dollars. If you use this as the developed-country threshold (the Updated Annex II scenario in table 1), only 34 nations qualified in 2009, giving the United States a \$38 billion proportional share.

A middle-ground criterion could be the World Bank's high-income country definition, which sets the threshold at \$12,276 per capita income. This measure increases the list of developed countries to 56 in 2009, with a proportional US share of \$35.7 billion. Table 1 also shows how the US share changes if this and the other criteria are applied to per capita income in 2020 (as projected by the Economist Intelligence Unit) rather than 2009.³ It's also worth noting that past practice within the UN is to limit income-based financial commitments from individual countries to 25 percent. Should that principle be applied to climate finance, the US share would decline to \$25 billion.

Another approach would be to classify countries as either developed or developing based on their per capita emissions, rather than per capita income, and then allocate climate finance responsibility among developed countries based on their annual emissions. Using the current Annex I list results in a US financial commitment of \$37.8 billion (table 2). Updating the list based on the per capita emissions of the bottom fifth of Annex I countries in 1992 captures an additional 27 nations and reduces the US commitment to \$27.5 billion. And unlike an income-based accounting, defining developed countries

3. In this analysis we assume that the \$100 billion overall target, as well as America's contribution, will be measured at current prices in 2020 (this was not specified in the Copenhagen Accord or Cancún Agreements). If instead the international community chooses to measure the \$100 billion target using constant 2009 dollars (the year in which the figure was agreed upon) the amount required at 2020 prices will likely be in the \$120 billion to \$140 billion range.

based on the per capita emissions of the bottom fifth of Annex II countries in 1992 nets more countries, not less, and takes the US commitment down to \$25 billion.

Neither criteria captures China or India, however, which have per capita emissions of 6.6 and 2.3 tons CO₂-equivalent concentration (including land use change) in 2009 respectively, compared to a 9-ton threshold under the Updated Annex I scenario and an 8.5-ton threshold under the Updated Annex II scenario. By 2020, however, China would qualify as developed using both the Updated Annex I and Updated Annex II criteria, provided emissions grow along the lines projected by the International Energy Agency (IEA) in the 2010 World Energy Outlook Current Policies Scenario (2020-BAU in table 2) (IEA 2010a). If the \$100 billion collective pledge is divided among countries that are developed in 2020 using these criteria, rather than 2009, the US share falls to \$16.6 and \$16.4 respectively. If all countries implement their Cancún Agreement (2020-CA in table 2) mitigation pledges, however, it would increase to \$26.9 in the Updated Annex I scenario, primarily because Chinese per capita emissions stay just below the threshold.

A third approach that could be used to allocate responsibility for providing climate finance is historical responsibility. This is most frequently measured through cumulative emissions since either 1850 or 1900, but is, in fact, the wrong measure. If the goal is to assess individual countries' responsibility for warming that has occurred already and will occur going forward, a more sophisticated calculation is required. Not all the greenhouse gases emitted 50 or 100 years ago are contributing to warming today. Non-CO₂ greenhouse gasses decay more quickly than CO₂ and fluctuations in carbon sinks (e.g., forests) shape the degree to which CO₂ emitted decades ago is responsible for temperate increases today.

Using the Climate Rapid Overview and Decision Support (C-ROADS) climate model, we assessed individual countries' contribution to temperature increases by year from 1950–2050, using the methodology outlined in *Copenhagen, the Accord, and the Way Forward* (Houser 2010). We find that the United States was responsible for 19.1 percent of the increase in global temperatures above pre-industrial levels in 2009 (figure 1). If the logic behind a “historical responsibility” approach to climate finance is that all countries pay for their share of the damages, regardless of their income level, then the US commitment would be \$19.1 billion based on 2009 levels of temperature change. Based on 2020 temperature levels, the US commitment would be \$18.3 billion.

The fact that this approach yields some of the lowest US financial obligations is ironic as Washington has traditionally resisted a historical responsibility approach to burden sharing within the UNFCCC. Yet a true temperature contribution analysis shows a much more balanced picture between developed and developing-country responsibility than a simple summation of past emissions would suggest. Admittedly, this methodology is more suited to determining financial burden sharing as related to adaptation, which is about compensating countries for the cost of coping with temperature changes they

did not create, rather than mitigation, which is about preventing further temperature increases. And in reality, the \$100 billion pledge is unlikely to be doled out to individual countries based on an objective, quantitative formula. But the estimates above provide a reasonable range of what an American fair share might be, against which we can measure the potential sources of US climate finance, which is the focus of the rest of this brief.

DIRECT BUDGET CONTRIBUTIONS

Currently, most international support for mitigation and adaptation in developing countries is financed with general tax revenue collected in developed countries and appropriated to bilateral and multilateral development assistance programs. In the US, this includes funding for the State Department and US Agency for International Development (USAID)'s climate-related programs and contributions to climate-related activities at the World Bank and other international financial institutions such as the Global Environmental Facility (GEF).

Among the potential sources of climate finance, most developing countries have a strong preference for direct budget contributions, provided they are managed and distributed by a suitable international institution. In the run-up to the Copenhagen conference, the largest developing-country negotiating block (known as the G-77 plus China) called for developed countries to provide 0.5 to 1 percent of their national GDP for climate finance and that these funds should be both additional to existing Official Development Assistance (ODA) and managed by a new international financial mechanisms under the UNFCCC (UNFCCC 2008). Developing countries have indicated this money should be directed to the poorest and most vulnerable nations first and China has indicated it does not expect to receive much in the way of financial support. The proposal also specified that this contribution should come primarily from public coffers in developed countries in the form of grants. Based on currently projected economic growth for Annex I countries, 0.5-1 percent of GDP would translate into between \$340 billion and \$680 billion in 2020. On average developed countries currently contribute 0.35 percent of GDP in overall ODA (Development Assistance Committee 2011). The \$100 billion target agreed to in the Copenhagen Accord and Cancún Agreements would amount to 0.15 percent of Annex I GDP in 2020 and represents a compromise between developed and developing-country positions.

US direct budget contributions for mitigation and adaptation have increased substantially in recent years, but will ultimately play a fairly limited role in meeting America's climate finance pledge. Between 1988 and 2008, the United States spent 0.21 percent of GDP on foreign aid, about one third less than the developed-country average and less than one-third what the United States spent during the four decades

following World War II (figure 2).⁴ Between 2008 and 2010, however, the US aid budget increased from 0.20 percent to 0.31 percent of GDP and the President's Fiscal Year (FY) 2011 budget requested an increase to 0.37 percent of GDP. Climate finance has played a big role in this international aid expansion. Between 2003 and 2009, US taxpayers provided \$250 million per year, on average, in financial support for climate change through the Departments of State and Treasury and USAID (referred to as "core agencies"). In 2010, this increased to \$1 billion along with an additional \$272 million in core agency funding in other areas with strong climate change co-benefits. Other parts of the US government provided an additional \$98 million in climate finance, bringing the total to \$1.38 billion (figure 3). For the 2011 fiscal year, President Obama increased his total international climate finance request to \$1.9 billion.

Maintaining the President's requested 2011 levels of direct budget support for international climate finance as a share of overall government spending would yield \$2.8 billion in 2020 (figure 3).⁵ Going much above this will be challenging in the current political and economic environment.⁶ According to the Congressional Budget Office (CBO), the United States will run a \$1.5 trillion budget deficit in 2011 (10 percent of GDP) (figure 4). While the country's fiscal situation will improve somewhat over the next decade as the economy recovers, under current policy the deficit will still be between \$740 billion and \$1.53 trillion in 2020 depending on whether a range of tax cuts currently slated to expire in the next couple years are extended. The new Republican majority in the House of Representatives has made curbing government spending a primary policy objective and debate between them and the Democratic majority in the Senate and the White House is over where and how much to cut spending, not whether spending needs to be cut at all. Increasing funding for any discretionary program will be a heavy lift.

In addition, Republican leadership is paying particularly close attention to climate change programs in their search for spending cuts. The FY 2011 budget that passed in April 2011 reduced overall discretionary spending by 7 percent relative to the President's budget request. But the funds appropriated for international climate finance were slashed by 33 percent relative to the FY 2011 request (figure 3). Even the President's own FY 2012 request curbs international climate finance by 5 percent relative to FY 2011 levels.

CARBON REVENUE

When Secretary Clinton announced the \$100 billion goal in Copenhagen, comprehensive energy and climate legislation was working its way through the US Congress. In June 2009, the House of Representatives had passed an economy-wide cap-and-trade bill known as the American Clean Energy

4. Aid statistics do not cover US defense spending, a non-trivial amount of which is used for humanitarian assistance, including disaster relief and conflict intervention.

5. Overall Federal Budget forecasts are from the Congressional Budget Office (CBO 2011).

6. For an excellent discussion of the current budget environment in Washington see Hufbauer and Wong (2011).

and Security Act (ACES). Under this program, power plants, oil refineries, natural gas distributors, and some manufacturing companies would have been required to submit an emission allowance for every ton of CO₂ or other greenhouse gas (GHG) released into the atmosphere. Some emission allowances would have been given out for free and some auctioned. Some of the auction revenue would have been used for international climate finance, above and beyond direct budget contributions (Waxman and Markey 2009). In 2020, roughly seven percent of allowances would be auctioned for this purpose. Given the range of auction prices forecast by the Energy Information Administration (EIA), this translates into between \$8.8 billion and \$16.2 billion in annual revenue (figure 5).⁷

In May 2010, Senators John Kerry and Joseph Lieberman released a counterpart bill in the Senate, dubbed the *American Power Act* (APA). The draft legislation was broadly similar to ACES, but the amount of allowance revenue dedicated to international climate finance was less certain. The bill only commits to use auction revenue from 0.75 percent of overall allowances in 2020 for international finance (Kerry and Lieberman 2010). The President, however, is given the authority to use up to an additional 5 percent of allowance value if a series of criteria are met, including the successful negotiation of an international climate change agreement and establishment of appropriate international climate funds. This uncertainty coupled with the range of auction prices forecast by the EIA translates into between \$1.15 billion and \$12.7 billion in annual carbon revenue available for international climate finance by 2020 (figure 5).⁸

From a recipient country standpoint, carbon revenue as a source of financing is not much different than direct budget contributions. Carbon revenue from a cap-and-trade program would in theory be more volatile than direct budget contributions, as it is determined by the price of allowances on the domestic carbon market. That said, the US appropriations process does not create long-term funding certainty either, as evidenced by the current budget debate. The key question for recipient countries will be how the money is used. Bilateral programs are generally less popular than multilateral funds, and multilateral funds managed by the World Bank or other existing international financial institution are generally less attractive than some new financial mechanisms under the control of the UNFCCC (of which the United States and other donor countries are less supportive).

The APA was never considered by the full Senate and the November 2010 Congressional elections changed the composition of the House of Representatives so that even if the Senate is able to pass cap-and-trade legislation (which it is not currently poised to do), the bill would have little chance of making it through the required House-Senate conference and onto the President's desk. A carbon tax could raise similar amounts of revenue for international climate finance but the Congress has not indicated any serious interest in discussing such legislation in the near term. The closest thing to

7. EIA estimates that allowances prices under the ACES would range \$26- to \$47-per-ton of CO₂ in 2020 (EIA 2009).

8. EIA estimates that allowances prices under the APA would range \$31- to \$44-per-ton of CO₂ in 2020 (EIA 2010b).

economy-wide energy and climate legislation currently being considered in Washington is a federal clean electricity standard, or CES. Such a program would require electrical utilities to source a certain share of their total electricity sales from clean sources such as renewable energy, nuclear, carbon capture and sequestration, and potentially high-efficiency natural gas generation. In his 2011 State of the Union Address, President Obama called on Congress to send him CES legislation with a national target of 80 percent clean electricity generation by 2035 (White House 2011b). While such legislation has the potential to reduce US GHG emissions as much as economy-wide cap and trade (at least for the first two decades), it does not generate any government revenue. While this is good news for US consumers, it cuts off an important potential source of international climate finance.

INTERNATIONAL OFFSETS

Both APA and ACES included another source of climate finance—international offsets. Under both bills, US firms could meet emission reduction targets by (a) reducing their own emissions through energy efficiency and clean energy, (b) buying emission allowances from other US firms on the domestic carbon market, or (c) paying for emission reduction projects in developing countries. Under the third option, the firm would receive 0.8 allowances for every ton of CO₂ or GHG emissions saved abroad.

While helping the purchasing firm reduce compliance costs, international offsets also benefit recipient countries. How much of a benefit has been the topic of considerable debate among international climate diplomats. Some developed countries have argued that the full value of the offsets purchased from developing countries (the gross flows) should count towards developed-country finance commitments. Many developing countries have argued that none of the value should count as those offsets are purchased to meet the developed country's own mitigation commitment, not to help with mitigation in the developing country. The AGF report outlines (but does not endorse) a possible compromise position—that the net value be credited against developed countries' financing commitments, rather than the gross value (AGF 2010a). In carbon markets, net flows are also referred to as inframarginal rents. The market price paid of all emission reductions during a given time period is determined by the cost of the last ton abated (the marginal cost). The difference between the marginal cost in the market and the actual abatement cost of all the players in the market is the producer surplus or inframarginal rent. If that producer (in this case an emission reduction project) is overseas and is selling into the carbon market through an offset, the inframarginal rent is a financial transfer above and beyond the actual cost of the emission reduction.

Like carbon revenue, financial support delivered through international offsets will be determined by allowance prices on domestic or international carbon markets, and thus be relatively volatile.⁹ In addition, the quantity of international offsets demanded will be determined by the cost and availability of domestic mitigation opportunities in developed countries. While models can be used to estimate future offset demand, there remains considerable uncertainty. The allocation of offset revenue among developing countries will also be determined by the market, rather than a politically negotiated formula, and will flow exclusively to mitigation rather than adaptation projects. Since large developing countries generally have the greatest abatement opportunities, they will likely receive the majority of offset revenue. This has certainly been true under the Clean Development Mechanism (CDM), the emissions offset program under the Kyoto Protocol. As of the beginning of November 2011, 58 percent of CDM offset activity had taken place in China.¹⁰

It's also difficult to ensure that the net flows (profit above the cost of mitigation) will be used for appropriate mitigation investments. In many developing countries individual companies, rather than the national government, sell offsets into international markets and the profits received flow to the companies' shareholders. This could potentially be addressed through the imposition of offset levies by developing-country governments that redirect inframarginal rents to mitigation and adaptation projects. But this would only address distributional issues within countries, not between countries. And as the countries' most in need of adaptation assistance have limited mitigation opportunities, offset revenue will ultimately be confined to mitigation support. Finally, a net approach to offset revenue is not only technically challenging to calculate, but politically challenging to gain support for among donor countries if significantly less than the gross transfers citizens in those countries see flowing to recipient nations.

Figure 6 shows both the gross and net values of international offsets projected under ACES and APA. Offset quantities are taken from EIA's Basic scenario for each piece of legislation. The gross value is calculated by multiplying offset quantity by EIA's projected allowance price in 2020.¹¹ The net value is calculated by subtracting the abatement cost of that offset activity, as defined in EIA's model, from the gross value. At roughly \$20 billion per year in net value by 2020 in EIA's Basic scenario, offsets are the largest potential source of US climate finance for developing countries. It's has also been considered the most politically feasible since offsets reduce compliance costs for regulated entities in the United States.

9. Cap-and-trade programs can be designed to include mechanisms, like banking and borrowing, which reduce price volatility.

10. For a complete breakdown, see <http://cdm.unfccc.int/Statistics/Issuance/CERsIssuedByHostPartyPieChart.html>

11. EIA estimates an allowance price of \$41 per ton of CO₂ in 2020 under ACES (Basic case) and \$39 per ton of CO₂ in 2020 under the APA (also Basic case). See EIA (2009) and EIA (2010b).

Yet as with carbon revenue, in the absence of a cap and trade or other form of carbon pricing legislation, it's difficult to see offsets playing a meaningful role in US domestic energy and climate policy.

BORDER CARBON ADJUSTMENTS

Under both ACES and APA, the United States would have required importers of certain energy-intensive manufactured goods like steel and cement to purchase emission allowances to cover the CO₂ emitted abroad in the production of that good if it was made in a country with weaker climate policy than the United States (Houser et al. 2008). Intended to protect US manufacturers from a loss of international competitiveness as the result of the compliance costs associated with cap and trade, these border carbon adjustments were intensely criticized by developing countries. In part, this was because the revenue raised through border carbon adjustments would have been retained by the United States. Using this revenue to finance mitigation and adaptation in developing countries has the potential to lessen opposition as well as help the United States meet its international commitments.¹²

Projecting the revenue potential of the border carbon adjustments in ACES and APA is challenging due to lack of specificity in the legislation regarding which countries would qualify and at what rate the border carbon adjustment would be applied. To come up with a rough estimate, we looked at the full range of products imported to the United States between 2006 and 2010 that would potentially qualify for border carbon adjustments and calculated the greenhouse gas emissions that would be released abroad if those goods were manufactured in the same way as they are in the United States. At a \$20-per-ton border carbon adjustment, this translates into \$4.3 billion in revenue in 2020 if imposed on all trading partners, assuming trade volumes remain at 2006–2010 levels (figure 7).¹³ As many developed-country trading partners would likely be considered to have comparable climate policy to that of the United States and thus be exempt from border carbon adjustments, revenue raised would likely be closer to \$1.8 billion, the share of the \$4.3 billion attributable to non-Annex I imports based on 2006–2010 trade data. At \$40 per ton (the carbon price projected under ACES and APA in 2020 by EIA), revenue would be \$3.6 billion assuming imports stay at 2006–2010 levels through 2020, and \$5.4 billion if carbon-intensive imports scale proportionally to overall imports as projected by EIA under ACES (EIA 2009).

Revenue from border carbon adjustments could be used for either mitigation or adaptation and could be spent bilaterally or contributed to a multilateral fund. As with carbon revenue and international offsets, border carbon adjustments are a much less promising source of climate finance in the absence of

12. For further discussion, see Matto et al. (2009).

13. We identified products imported between 2006 and 2010 that would potentially be subject to a border carbon adjustment as defined in ACES and APA and the emissions intensity of those products, using the methodology developed in EPA (2009) and trade data from USITC (2011).

cap and trade or other carbon pricing legislation. Border carbon adjustments may, however, be explored by US policymakers in the future as a tool for protecting industry against any loss of international competitiveness resulting from GHG regulations issued by the Environmental Protection Agency.

INTERNATIONAL AVIATION AND MARITIME TRANSPORTATION

Fuels used in aviation and maritime transportation are responsible for roughly 3 percent of global GHG emissions (McCollum, Gould, and Greene 2009). The portion of these emissions attributable to international flights and ocean shipping (the majority) are exempt from national emission reduction commitments under both the UNFCCC and Kyoto Protocol. And most countries have opted to exclude fuels used in domestic aviation and maritime transport from national climate policy (including the United States under both ACES and APA). Instead, climate diplomats have looked to the International Maritime Organization (IMO) and the International Civil Aviation Organization (ICAO) to produce international emission reduction agreements covering international transport.

International aviation and transport has long been seen as a potentially significant source of climate finance, but neither IMO or ICAO have been able to reach agreement on either an international cap-and-trade program or carbon levy for these sectors (Project Catalyst 2009). Part of the problem is that in IMO and ICAO all countries are treated equal whether developed or developing. But imposing a carbon price on international transport equally in all countries is a violation of the UNFCCC's principle of "common but differentiated responsibilities" in the eyes of many developing countries. Using all the revenue generated from a carbon price in the aviation and marine transport sectors to support mitigation and adaptation projects in developing countries can help address some of these concerns, but it remains unclear whether ICAO and IMO will be capable of delivering a multilateral solution.

In the absence of a multilateral approach, the European Union has decided to include aviation in its domestic emissions trading scheme in 2012 (European Commission 2010). All flights into and out of the European Union will need to purchase allowances through the EU Emissions Trading Scheme (ETS) to cover their emissions. The European Commission has indicated this program will be expanded to cover maritime transport in 2013 if an international agreement covering maritime transport is not reached by the end of 2011. Anger among EU trading partners, however, is testing Europe's commitment. Chinese airlines, for example, have delayed purchases of Airbus wide-body aircraft in recent months citing concern over the emissions trading scheme. And in October 2011 the US House of Representatives passed legislation preventing US carriers from taking part in the scheme (as of writing that legislation still required Senate and White House approval).

If, despite current political opposition, the United States were to take the same approach and impose a \$40 per ton carbon price on both domestic and international flights, the price projected under

both ACES and APA in 2020, \$11 billion would be raised that year (figure 8).¹⁴ Roughly 40 percent of this would come from domestic passenger flights, 40 percent from international passenger flights and the remainder from freight transport flights both foreign and domestic. This would raise the price of the average one-way international flight by \$13.50 (3 percent of projected ticket face value) in line with current international airline taxes (figure 9).¹⁵ Including maritime transport would increase revenue to \$3 billion in 2020, three-quarters of which would come from international shipping.

These estimates reflect what the United States would raise if unilaterally imposing a levy on both inbound and outbound airplanes and ships. To avoid double-taxing transport to countries/regions imposing their own international transport levy, such as the European Union, the United States would likely seek reciprocity agreements where the flight or shipment is only taxed by one party. This would reduce the total amount collected by the United States. If countries are able to reach agreement on global system through ICAO or the IMO (the ideal from a policy design standpoint) the revenue attributable to the United States would be reduced by at least one-half relative to the amounts listed in figure 8.

As with border carbon adjustments, carbon revenue and direct budget contributions, funds raised through carbon pricing in aviation and transport could be used for both mitigation and adaptation and could be spent bilaterally or through a multilateral institution. While the EPA has the authority to regulate GHG emissions from US aircraft and ships, Congressional action would be required to price aviation and maritime emissions and use the revenue raised for international mitigation and adaptation. This could be done through a domestic cap-and-trade system (as in Europe) but a stand-alone levy would work as well. Relative to economy-wide carbon pricing, there is more political support in the United States for a policy that only raises costs for higher income airline passengers and that would treat foreign travelers and exporters equal to US travelers and exporters. As with direct budget contributions, the political challenge will be convincing US taxpayers that this new revenue should be used for international mitigation and adaptation, as opposed to domestic programs.

FOSSIL FUEL SUBSIDIES

Building on a 2009 G-20 commitment to rationalize and phase out subsidies for fossil fuels, the AGF examined the potential for redirecting fossil fuel subsidies towards climate finance. The IEA estimates that subsidies to fossil fuel consumption (excluding production subsidies) amount to \$550 billion per year (IEA 2010b), so the potential revenue is vast. Much of this subsidization occurs within developing countries and much of what occurs in developed countries is not on the table for removal. Looking at the national plans for fossil fuel subsidies elimination submitted to G-20 leaders, the AGF estimates that

14. Calculated using emissions projections from EIA (2010a).

15. Projected ticket prices derived from EIA (2010a) and Bureau of Transportation Statistics T-100 Market data.

up to \$8 billion annually could be raised for mitigation and adaptation in developing countries if all developed-country subsidies identified in the national plans are redirected towards climate finance (AGF 2010b).

Coming up with a robust estimate of potential climate finance from the redirection of US fossil fuel subsidies is challenging. Requisite data are not regularly available or spread across multiple agencies with little incentive for centralized compilation. In 2007, the US Energy Information Agency estimated fossil fuels received \$5 billion in government aid mostly through tax expenditures (EIA 2008). The Environmental Law Institute estimates that from 2002–2008 the federal government spent \$72 billion, or an average of \$12 billion a year (Environmental Law Institute 2009).

President Obama proposed eliminating \$4 billion to \$5 billion a year in tax preferences for fossil fuels in 2020 in both his FY 2011 and FY 2012 budget requests (table 3). While none of these proposals made it into the final FY 2011 budget compromise. Removal of some fossil fuel subsidies, however, may still find their way into law. With oil prices topping \$100 per barrel and oil and gas companies booking record profits during spring 2011, the President ratcheted up his push for cutting oil and gas tax preferences calling on Congress to pass legislation to that effect introduced by Sen. Robert Menendez (D-NJ). While the bill failed its first vote in the Senate, it could still find its way into a broader budget compromise, either over raising the debt ceiling or FY 2012 spending.¹⁶ Any revenue gained from fossil fuel subsidy removal over the next couple years, however, will almost certainly be directed to deficit reduction or fund domestic, rather than international, clean energy programs. In a letter to Congressional leaders in the spring of 2011, President Obama himself proposed eliminating wasteful subsidies as a way to reduce the deficit and preserve spending on domestic clean energy and energy efficiency programs (Obama 2011).

FINANCIAL TRANSACTION TAX

In considering innovative sources of climate finance, the AGF explored the possibility of taxing financial transactions like currency and securities trading (AGF 2010c). Financial transaction taxes (FTTs) have received renewed attention following the 2008 financial crisis. Given the enormous volume of global financial transactions processed each year, even an extremely small tax can raise significant sums of money. In addition, advocates of FTT's argue they reduce speculative activity in financial markets and improve financial stability.¹⁷

16. House GOP leaders, including Speaker John Boehner and Majority Leader Eric Cantor, have indicated they would support the phase-out of oil tax benefits in the context of broader corporate tax reform (Schor 2011).

17. See, for example, Paul Krugman. 2009. Taxing the Speculators, *New York Times*, November 26.

The AGF assessed the global revenue potential of an FTT on a variety of instruments (foreign exchange, stocks, bonds, derivatives, etc.) at tax rates ranging from 0.001 percent to 0.01 percent, adjusting for reductions in transaction volume resulting from the tax. To gauge how much revenue the United States specifically could raise through FTTs, we applied the AGF's methodology (using the AGF's median tax rate) to financial transactions occurring within the United States. High- and low-end estimates for potential revenue in 2020, using the AGF's high- and low-end assumptions for volume reductions and assuming transaction volume grows at the same rate as GDP between now and 2020 (a decidedly conservative estimate).¹⁸ In total, a tax of 0.0025 percent on foreign exchange and interest rate derivatives trading and a tax of 0.005 percent on securities trading in the United States would yield between \$100 billion and \$115 billion in revenue in 2020. If the United States pursued a FTT alone, however, potential revenue would likely be significantly reduced as trading activity moved to non-US financial centers to avoid the tax.

Developing-country participants in the AGF expressed concern over the impact of an FTT on developing-country economies. While a truly universal FTT would be the most efficient, it would also impose costs on developing countries with large financial centers. In addition, developing-country citizens and firms are party to a meaningful share of the financial transactions that take place in developed countries, so even an FTT implemented in developed-country financial centers only would have developing-country incidence. The AGF report suggests that 8.5 percent of revenue raised through a global FTT would be required to offset developing-country costs.

In the wake of the financial crisis, a number of European policymakers called for a FTT, including French President Nicholas Sarkozy and then-British Prime Minister Gordon Brown. Several prominent US economists echoed these calls, including Paul Krugman and Joseph Stiglitz. US government officials, however, have been less supportive. Treasury Secretary Timothy Geithner came out in opposition shortly after the financial crisis and the United States has resisted European efforts to put an FTT on the G-20 agenda (Monaghan 2011).

An FTT would require Congressional action and while taxing financial transactions may be more politically attractive than alternative forms of taxation, there is little Congressional appetite to revisit financial regulation following the passage of the wide-ranging Wall Street Reform and Consumer Protection Act in 2010. In addition, given the current fiscal environment in the United States and the fact that an FTT has little to do with climate change, it would be extremely challenging to win Congressional support for dedicating more than a fraction of the revenue raised to climate finance, even if an FTT was enacted.

18. Financial transaction data from BIS (2010a, 2010b).

MULTILATERAL DEVELOPMENT BANKS

The AGF also explored how much additional financial support for climate change Multilateral Development Banks (MDBs), such as the World Bank, the Asian Development Bank, and the African Development Bank, can provide (AGF 2010d). Donor countries capitalize the MDBs through paid-in capital (money physically transferred to the MDBs) and callable capital (money committed to the MDBs that is kept by the donor country unless it is needed to cover bad MDB loans). This allows the MDBs to borrow at rates similar to developed-country governments. Low borrowing costs coupled with good relationships with recipient governments and preferred creditor status with borrowers allow the MDBs to provide middle-income developing countries with lower-cost financing than is available from private capital markets. For low-income developing countries, MDBs utilize aid from donor countries to further reduce financing costs.

MDBs recently approved General Capital Increases (GCIs) to further strengthen their balance sheets. The AGF estimates the additional capital provided by donor countries through these GCIs (either paid-in or callable) will allow the MDBs to provide an additional \$687 billion in development finance between now and 2020 (known as “headroom”). Given projected growth in non-climate financing demand, the AGF estimates that \$278 billion is potentially available for financing mitigation and adaptation projects in developing countries over the next decade. Assuming linear growth, this translates into \$56 billion in 2020. Given the US share of current MDB paid-in and callable capital, \$10 billion of the \$56 billion could be claimed as a US contribution (table 4).

From a US political standpoint, leveraging existing MDB headroom to meet climate finance obligations is attractive because it does not require new appropriation or Congressional action. Developing countries, however, will likely resist claims from the United States and other developed countries that the gross increase in MDB climate finance between now and 2020 should be counted towards the \$100 billion Cancún Agreements pledge. MDB financing to middle-income developing countries comes primarily in the form of loans (either direct loans or guarantees of private sector loans). And while most developed countries interpret the Cancún Agreements as allowing both grants and loans to count towards the \$100 billion, most developing countries will argue for a more traditional foreign aid calculation—where only the grant element of a loan can count.

The Development Assistance Committee calculates the concessionality of a loan—the grant element—as the amount by which the present value of the expected stream of repayments under a concessional loan falls short of the repayments that would have been generated if the loan was provided under market terms in the country in question.¹⁹ To get a rough estimate of the grant element of \$10

19. For full documentation, see OECD (2011).

billion in MDB lending attributable to US paid-in and callable capital, we calculated the prevailing market interest rates in all non-Annex I countries between 2008 and 2010 and compared that to lending rates offered by the World Bank's International Bank for Reconstruction and Development (IBRD) during the same period.²⁰ Under comparable repayment terms, \$10 billion in IBRD lending to non-Annex I countries carries up to a \$4.2 billion grant element (table 5). This assumes all non-Annex I countries qualify for IBRD loans, which is not the case. Also, IBRD loans are extended to developing-country governments or state-owned enterprises and are generally guaranteed by the recipient government, which lowers borrowing costs. Other MDB's such as the International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA) provide financing to private sector companies in developing countries and generally charge a risk premium which raises lending costs and reduces the grant element of the financing package. Thus \$4.2 billion should be treated as an absolute upper bound estimate. The grant element of MDB financing can be increased through additional appropriated funds from developed countries.

It may also be the case that the benefit provided by MDB's low borrowing costs, strong government relations, and preferred creditor status is insufficient to make many mitigation and adaptation projects viable. This is particularly true if the difficult fiscal situation developed-country MDB donors face increases their borrowing costs, and thus MDB borrowing costs. Additional public funds may need to be combined with existing MDB financing capacity to fully utilize the available headroom.

BILATERAL CREDIT AGENCIES

In addition to working through the MDBs, the United States can leverage its low borrowing costs to financing mitigation and adaptation projects in developing countries bilaterally. The Overseas Private Investment Corporation (OPIC) is an independent US agency established in 1969 that helps developing countries attract US investment (Ilias 2009a). OPIC offers direct loans at lower rates available from private lenders, like the IBRD, as well as loan guarantees and insurance products that reduce the cost of private sector financing, like the IFC and MIGA, both part of the World Bank Group. As with MDBs, OPIC is able to reduce financing costs for developing countries because of its strong credit rating (OPIC is backed by the full faith and credit of the US Government), good relationships with recipient governments, and preferred creditor status. OPIC is financially self-sustaining (it earns enough income to cover its expenses and does not require Congressional appropriation) but also has a mandate not to compete with the private sector (OPIC is only supposed to finance projects that are unable to access private capital without OPIC's involvement).

20. Non-Annex I lending rates were compiled using data from the Economist Intelligence Unit and weighted by GDP. World Bank lending rates are IBRD flexible loans, available at <http://treasury.worldbank.org/>.

The US Export-Import Bank (Ex-Im), established in 1934, offers financial products similar to OPIC (e.g., direct loans, loan guarantees, insurance) but does so on behalf of US exporters, rather than US investors (Ilias 2009b). Ex-Im also works in both developed and developing countries, as opposed to OPIC's developing-country focus. But Ex-Im enjoys the same low borrowing costs, strong relationships with recipient governments and preferred creditor status as OPIC and can thus generally offer financing at lower rates than available through private markets alone. Like OPIC, Ex-Im has a dual mandate of (a) operating on a self-sustaining basis without additional tax-payer support, and (b) not competing directly with private capital.²¹

Potential climate finance flows from OPIC and Ex-Im are considerable. In 2010, Ex-Im provided \$24.5 billion in total export finance, 68 percent of which went to non-Annex I countries (Ex-Im Bank 2011).²² OPIC financed \$2.4 billion worth of projects, 78 percent of which were in non-Annex I countries. As long as they are able to maintain current investment performance levels, both Ex-Im and OPIC can expand further in the years ahead without additional Congressional appropriation. Congress would, however, need to authorize such an increase through legislative action. This would be a far easier feat than any of the other Congressional actions we've identified thus far, because there is no budgetary impact for the United States and in the case of Ex-Im, providing financing to developing countries comes with the politically attractive promise of increased US exports. Using the US government balance sheet to extend low-cost financing to developing countries does, of course, have the potential to negatively impact borrowing costs in the United States at a large enough scale. But even doubling the size of OPIC and Ex-Im's overall portfolio would only increase the size of US Government-backed liabilities by one-half of one percent, and there would be credible assets on the other side of the ledger (as OPIC and Ex-Im default rates are low) (*Federal Reserve 2011*).

Congress has directed Ex-Im to dedicate 10 percent of all financing to climate friendly exports (GAO 2010), up from 1.3 percent currently (Ex-Im Bank 2011). To calculate potential Ex-Im climate finance totals in 2020 we assumed Ex-Im achieves this target and the share of overall US exports the bank finances remains the same. In 2010, Ex-Im financed 1.9 percent of all US exports. Financing 1.9 percent of total US exports in 2020 based on trade projections from the EIA (2010a) would result in \$86 billion in total Ex-Im financing that year. Meeting the Congressionally-mandated 10 percent target would then increase gross annual Ex-Im mitigation finance from \$300 million to \$8.6 billion.

No such target exists for OPIC so we start by assuming that the bank's past climate finance growth rates continue through 2020. OPIC climate financing has increased at an average annual rate of 15 percent over the past decade (see OPIC 2000 through OPIC 2010). Sustaining this growth rate through

21. For a discussion of current issues facing Ex-Im, see Hufbauer, Fickling, and Wong (2011).

22. Excludes multi-buyer insurance, short term.

2020 would result in \$1.5 billion in climate finance that year, a \$1.1 billion increase over current levels. An aggressive climate finance push within OPIC could grow the bank's climate finance portfolio at twice the rate experienced during the past decade, delivering \$5 billion in gross annual climate finance flows by 2020. This, however, represents the upper bound of what OPIC would likely be able to deliver as currently structured.

As with MDB financing, developing countries will likely contest efforts by the United States and other developed countries to count gross financial flows catalyzed by bilateral credit agencies towards the \$100 billion Cancún Agreements commitment. The grant element of OPIC and Ex-Im financing is difficult to assess as a country and credit risk premium is included specific to each deal (similar to IFC and MIGA). Our rough estimate based on current US and non-Annex I interest rates and published Ex-Im and OPIC guidelines is a grant element between 7 percent and 28 percent of the total financing package. That means there is the potential for between \$670 million and \$3.6 billion in additional net annual climate finance flows from both banks by 2020. And also as with MDBs, it's unclear whether the capital cost advantage provided by Ex-Im and OPIC financing alone will be sufficient to make many mitigation and adaptation projects commercially viable. The fact that Ex-Im has been unsuccessful in meeting Congress's 10 percent target thus far suggests there might be inadequate demand either for US climate-friendly exports at the terms Ex-Im offers. OPIC, which supports US investors but is not restricted to projects that use US-manufactured products has done better. More than 15 percent of total OPIC financing went to mitigation projects in 2010.

Finally, the US fiscal outlook may reduce policymakers' appetite to leverage the government's balance sheet to finance projects in developing countries, and might reduce the benefit of a US government guarantee in terms of overall project cost. In August 2011, Standard & Poor's downgraded the US credit rating from AAA to AA+ due to concerns about the country's long-term fiscal health. That move has yet to have a noticeable impact on government borrowing costs as US debt is still seen as safer than other available assets, particularly in light of ongoing euro area troubles. But an improvement in the fiscal outlook in Europe and elsewhere could put upward pressure on US borrowing costs in the years ahead.

CONCLUSION

Fulfilling America's climate finance commitment, made in Copenhagen in 2009 and again in Cancún in 2010, is crucial both to protect diplomatic progress made to date and help ensure large developing countries like China and India do their part to address climate change in the years ahead. A domestic cap-and-trade program similar to the plan adopted by the House of Representatives in 2009 would have mobilized between \$10 billion and \$64 billion per year by 2020 in public and private finance for

mitigation and adaptation in developing countries, depending on whether a net or a gross calculation is used. This would have been largely sufficient to cover America's fair share of the \$100 billion developed-country pledge.

The US Senate's failure to pass cap-and-trade legislation, the subsequent Republican takeover in the House of Representatives, and the dire US fiscal outlook makes meeting America's climate finance pledge much more difficult. Increasing direct budget contributions above current levels will be extremely challenging, with \$2.8 billion as the high end of what we think possible in 2020. A financial transactions tax could raise considerable revenue but there is little prospect for the adoption of such a tax in the United States and no prospect that, if adopted, its revenue would be used for international climate finance. And while elimination of some fossil fuel subsidies may occur as part of a budget compromise between the White House and Congressional Republicans, the revenue will be used for deficit reduction or to support clean energy deployment within the United States.

American climate negotiators' best bet is to push MDBs to use existing lending headroom following recent capital increases to deliver new climate finance and push Ex-Im and OPIC to more aggressively pursue climate-oriented financing in the years ahead. Together these sources can deliver \$23 billion per year by 2020 (gross) which, when combined with plausible direct budget contribution flows would total \$25 billion (table 5). This satisfies the lower end of the range of estimates of America's fair share discussed above, and would not require new Congressional appropriations (other than defending currently proposed direct budget contribution levels as a share of total government spending). If developing countries insist that a net, rather than gross, measurement must be applied, MDBs, bilateral credit agencies and direct budget contributions will only be able to deliver \$10 billion at most by 2020 in annual climate finance.

The main shortcoming of this approach is that, by relying on MDBs and bilateral credit agencies, it will likely favor mitigation over adaptation, and large developing countries over small developing countries. US exports are more likely to play a role in mitigation projects in emerging economies than adaptation projects in small island states, for example, and mitigation projects tend to be closer to commercial viability and thus more suited for MDB and bilateral credit agency loan, insurance and guarantee products. Yet it was the promise of financial support for adaptation that helped unlock climate talks in Copenhagen and Cancún and insuring that the vulnerable countries receive much needed support will be critical in advancing international climate cooperation.

It's important to remember that the \$100 billion was a collective developed-country pledge, so it's possible that Europe and Japan could focus more on adaptation to offset a US focus on mitigation. But the budget outlook is pretty bad in Brussels and Tokyo as well, making it tough to use existing tax revenue to support international adaptation. Europe and Japan will likely rely heavily on international offsets to

meet their climate finance commitments, which are tied to mitigation unless the developing-country recipient utilizes offset revenue for domestic adaptation projects.

Of the options for generating meaningful amounts of adaptation finance currently available, a levy on international aviation is probably the most politically feasible. As mentioned earlier, the European Union has already taken a step in this direction and the unilateral nature of their move has touched off Congressional opposition in the United States and the threat of retaliation from China. Make no mistake, negotiating a multilateral compromise that uses revenue to help the most vulnerable developing countries adapt to the impacts of a warmer world, won't be easy. Talks taking place through ICAO have produced little progress to date. But Europe's move forces these talks to center stage and raises the cost of failure. And in the current political and fiscal climate, alternative sources of adaptation finance are going to be even harder to come by.

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Table 1 Defining ‘developed’ countries (per capita GDP)

	Number of countries	Percent of global GDP	US share of \$100 billion
2009			
Current Annex I	40	73.4	36.1
Updated Annex I	83	85.4	31.1
Updated Annex II	34	69.7	38.0
World Bank high income	56	74.3	35.7
2020			
Current Annex I	40	63.0	36.1
Updated Annex I	96	90.2	26.2
Updated Annex II	39	63.0	37.5
World Bank high income	65	72.9	32.7

Source: GDP estimates from EIU (2011). World Bank income classifications from (World Bank 2011). List of current Annex I and Annex II countries can be found at http://unfccc.int/key_documents/the_convention/items/2853.php.

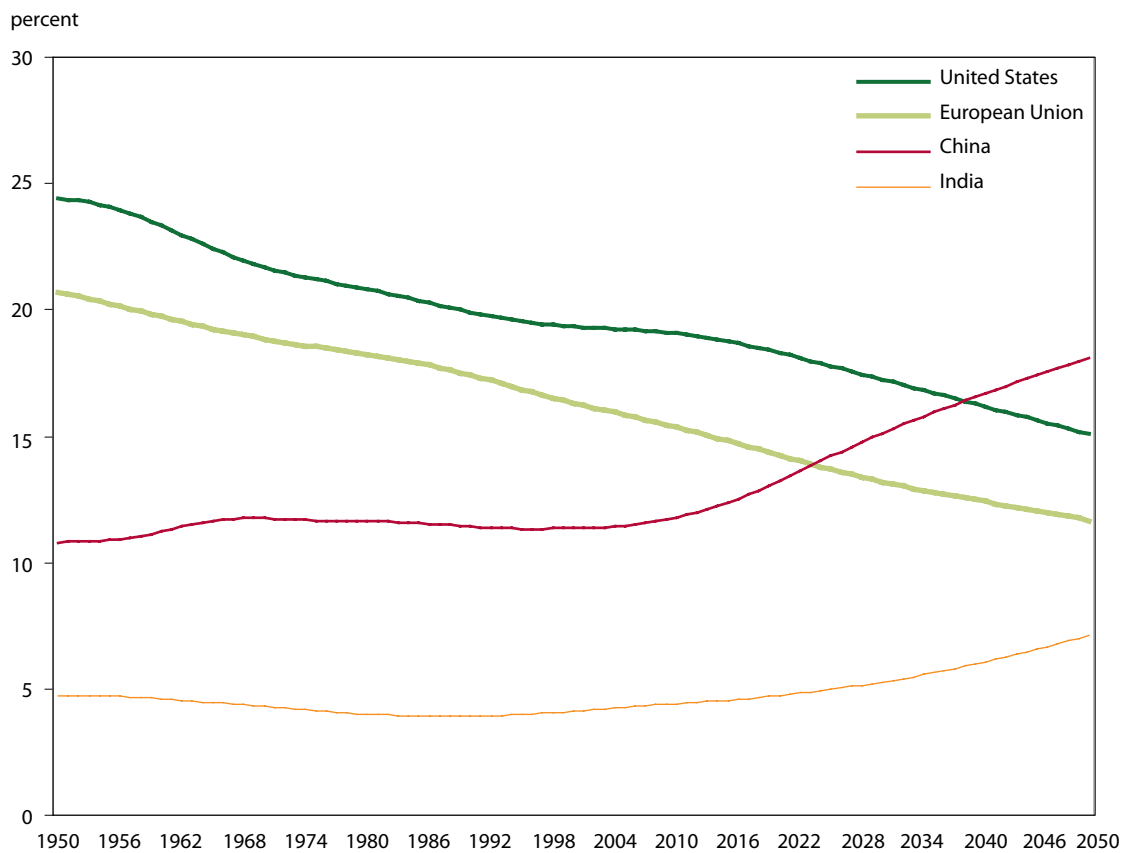
Table 2 Defining ‘developed’ countries (per capita emissions)

	Number of countries	Percent of global emissions	US share of \$100 billion
2009			
Current Annex I	40	40.0	37.8
Updated Annex I	67	55.1	27.5
Updated Annex II	73	60.6	25.0
2020-BAU			
Current Annex I	40	34.1	37.1
Updated Annex I	79	76.3	16.6
Updated Annex II	79	77.3	16.4
2020-CA			
Current Annex I	40	33.1	38.1
Updated Annex I	69	46.8	26.9
Updated Annex II	76	75.1	16.8

Note: 2020-BAU refers to the International Energy Agency’s “Current Policies Scenario” as outlined in IEA (2010a). 2020-CA adjusts this scenario to account for mitigation actions agreed to in Cancún. A list of current Annex I and Annex II countries can be found at http://unfccc.int/key_documents/the_convention/items/2853.php

Source: Emissions estimates are from WRI (2010) and include all greenhouse gasses and emissions from forestry and land-use change.

Figure 1 Contribution to global temperature increases above pre-industrial levels



Source: Climate Rapid Overview and Decision Support (C-ROADS) climate modeling tool as described in Houser (2010) using updated emissions projections from the IEA (2010a).

Figure 2 US foreign aid as a share of GDP

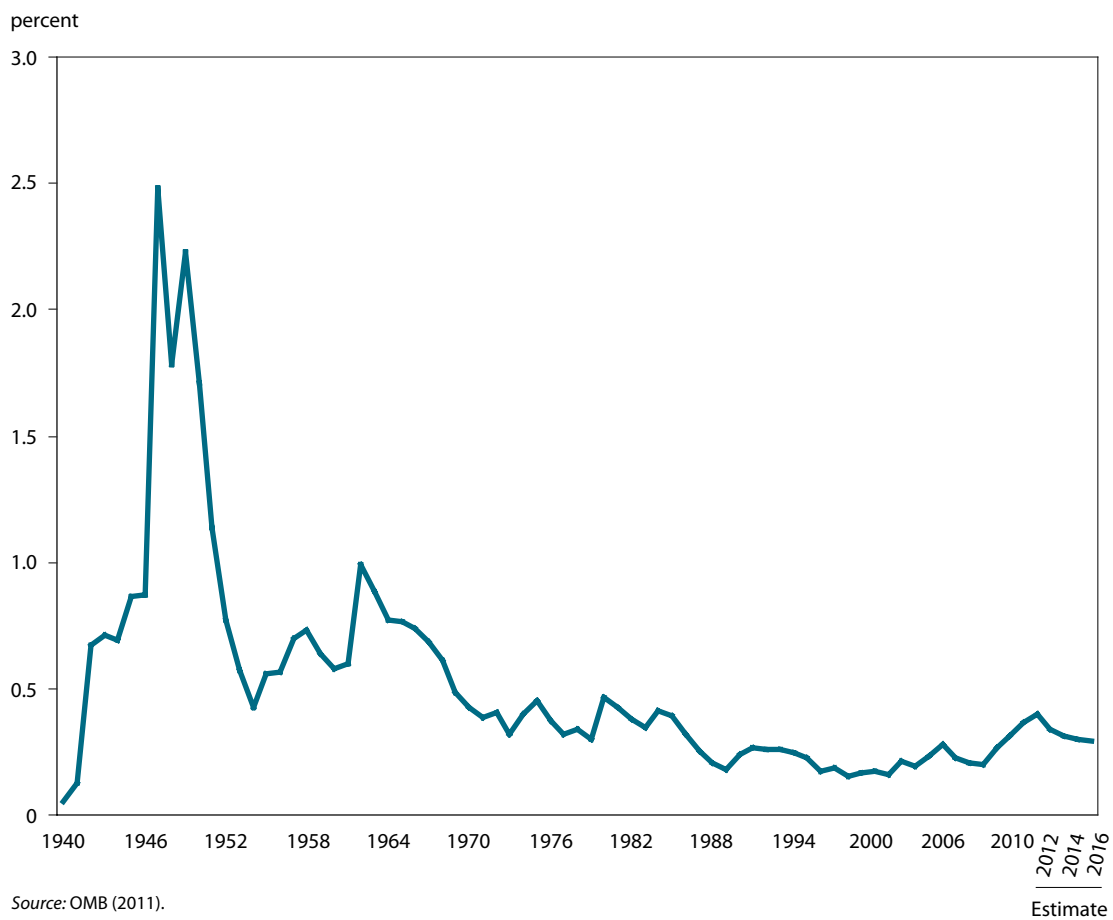
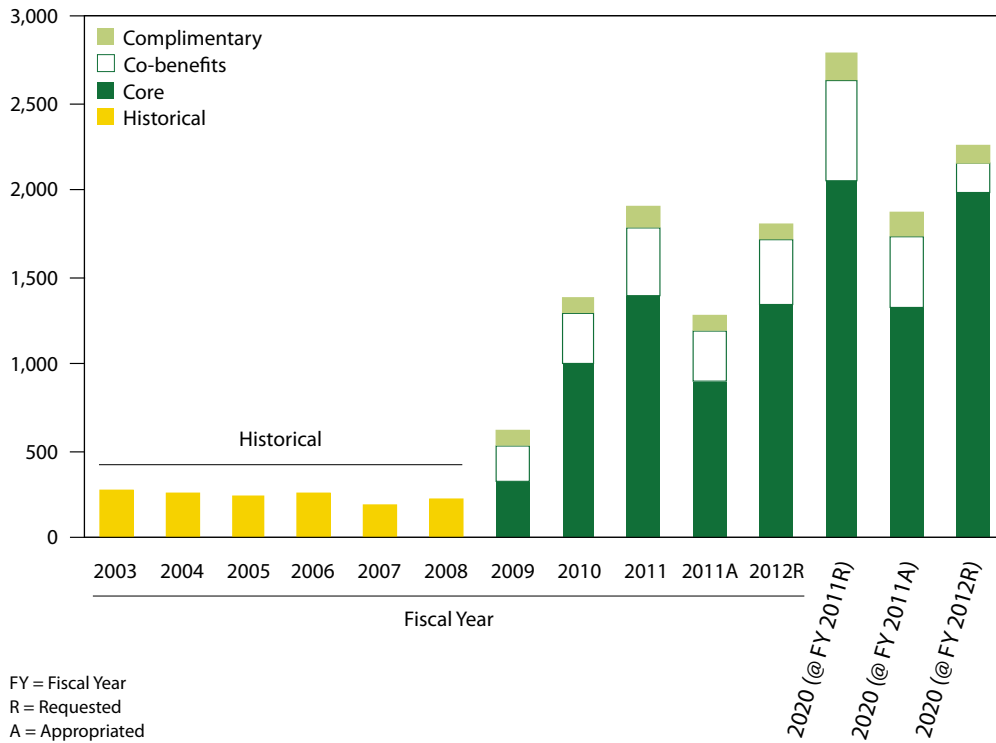


Figure 3 US international climate finance

millions of US dollars

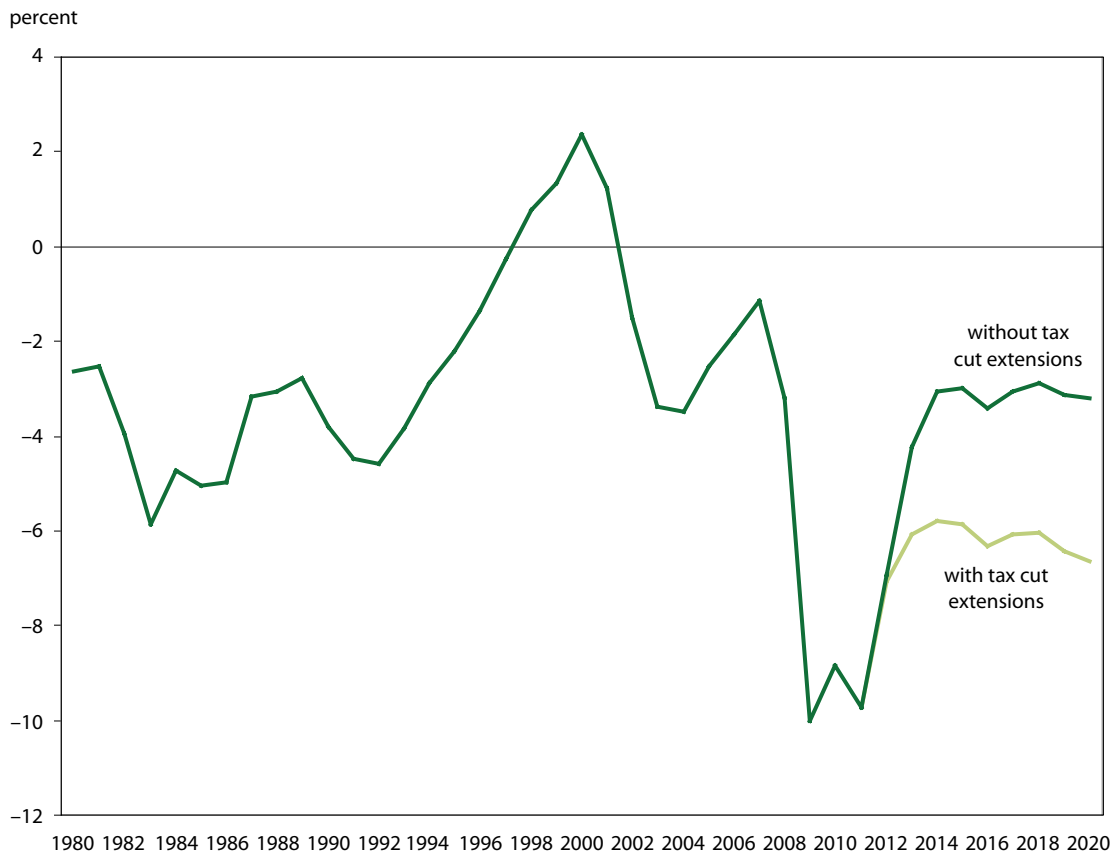


FY = Fiscal Year
R = Requested
A = Appropriated

Note: FY 20 projections based on FY 11/FY 12 shares of federal spending as forecast by the Congressional Budget Office.

Source: CBO (2011), DOS (2010a), DOS (2010b), DOS (2011), OMB (2007), OMB (2011), OMB (2010), United States Congress (2011).

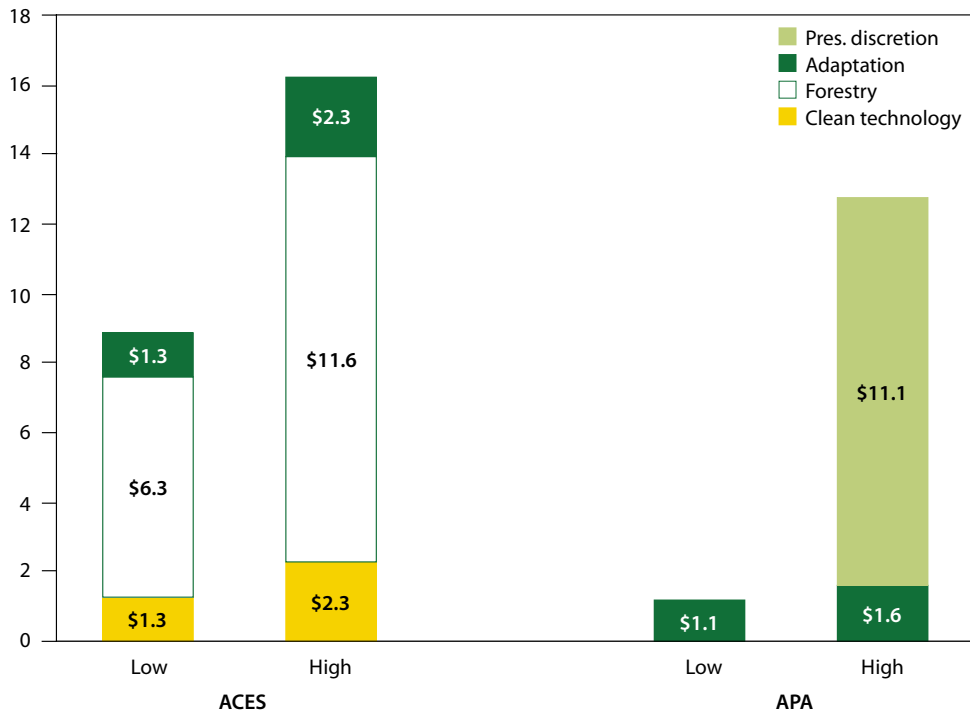
Figure 4 US federal budget balance as a share of GDP



Source: CBO (2011).

Figure 5 International carbon revenue from proposed cap-and-trade programs

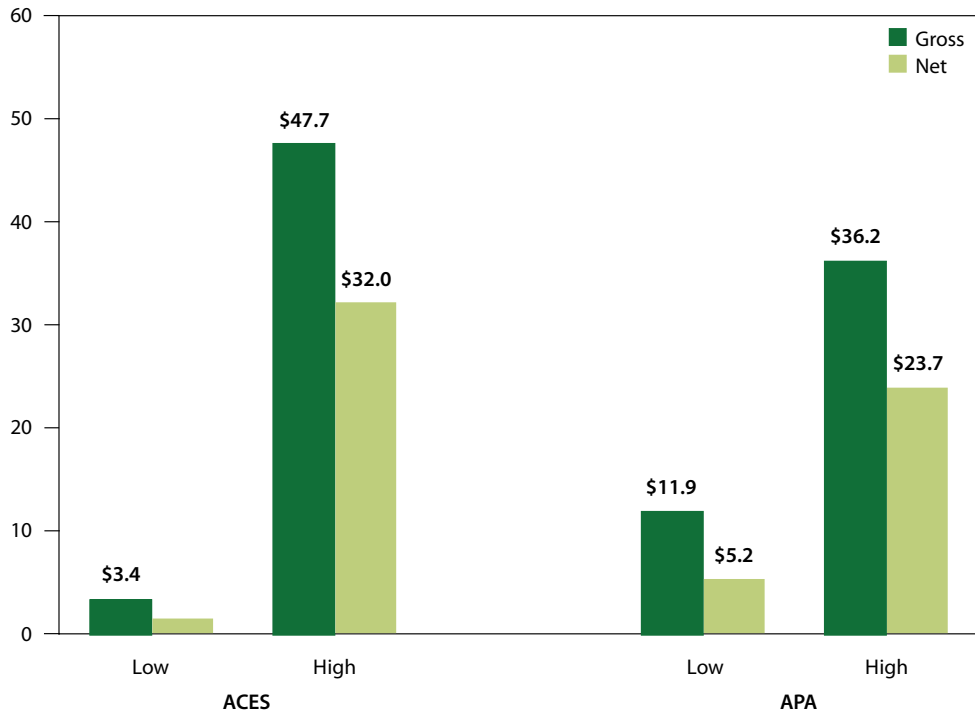
billions of US dollars per year in 2020



Source: EIA (2009), EIA (2010b).

Figure 6 International offset revenue from proposed cap-and-trade programs

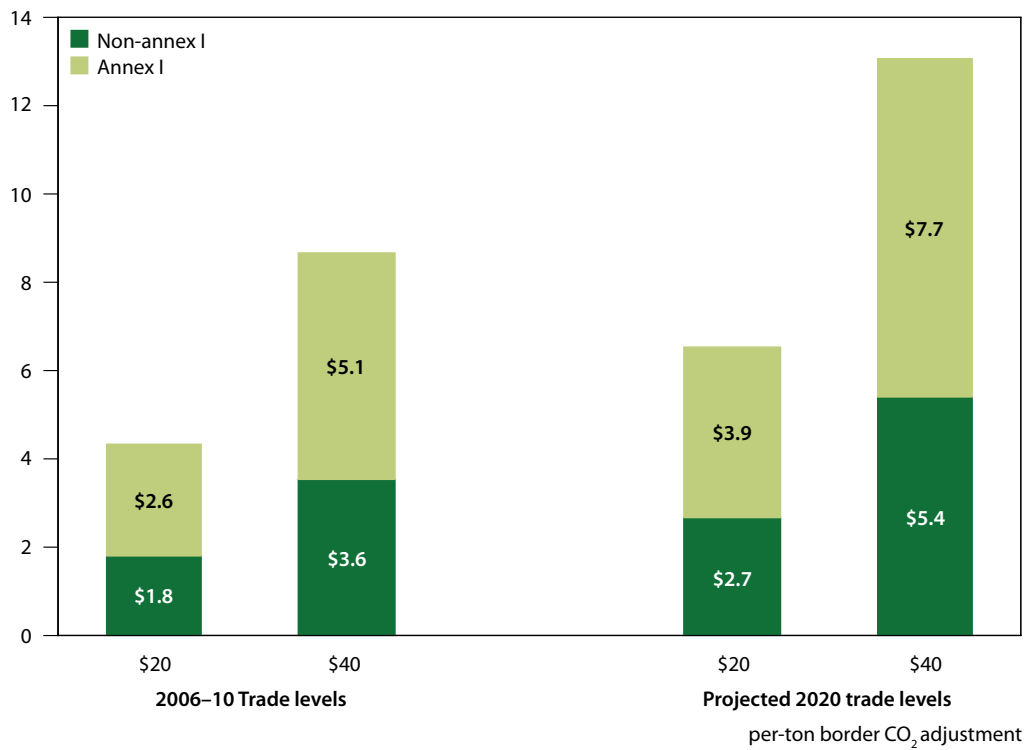
billions of US dollars per year in 2020



Source: EIA (2009), EIA (2010b).

Figure 7 Potential revenue from border carbon adjustment

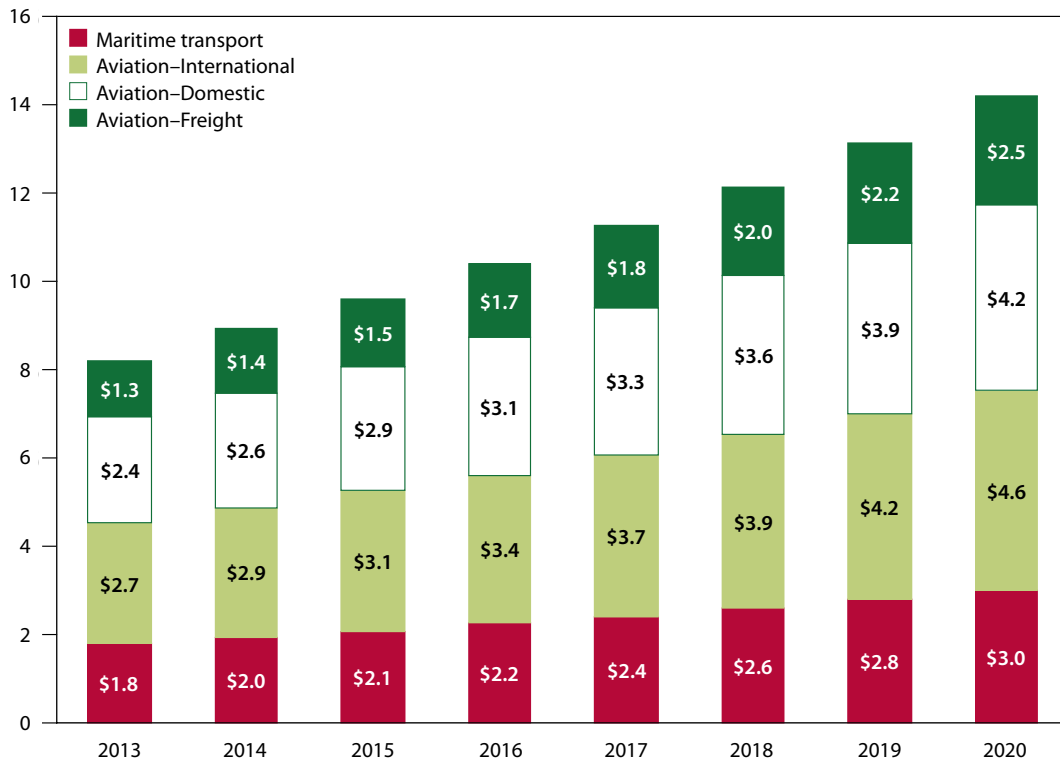
billions of US dollars per year in 2020



Source: EIA (2010b), EIA (2009), EPA (2009), USITC (2011).

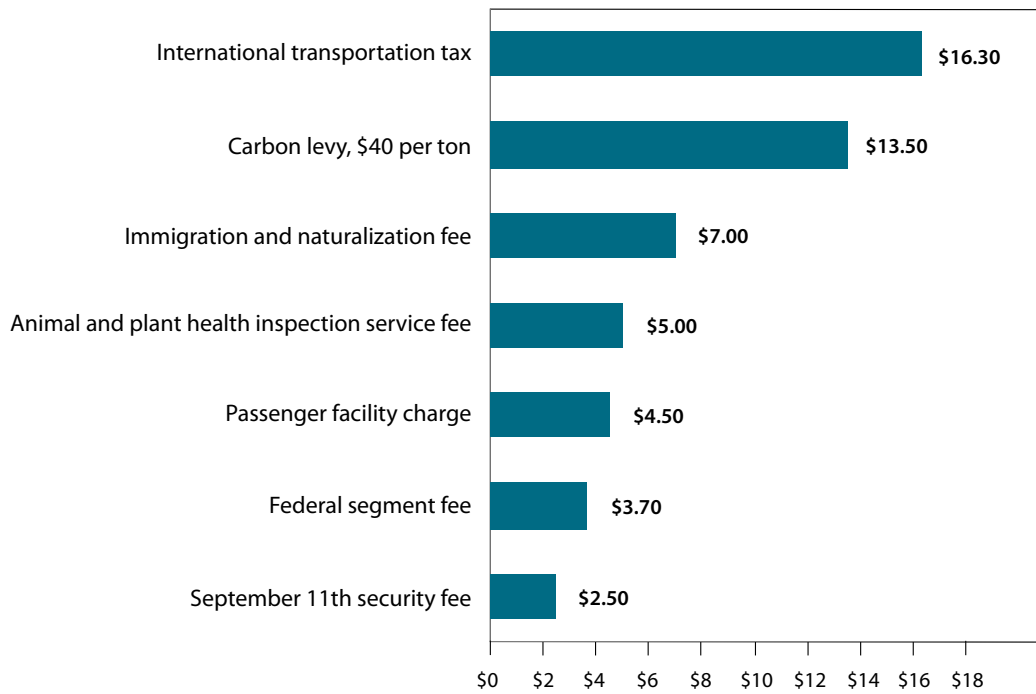
Figure 8 Potential revenue from a US carbon levy on maritime and aviation emissions

billions of US dollars per year



Source: EIA (2010b), RITA (2010), Waterborne Commerce Statistics Center (2008).

Figure 9 Per-ticket cost of an aviation carbon levy relative to other fees (international one-way flight)



Source: EIA (2010b), RITA (2010), Waterborne Commerce Statistics Center (2008).

Table 3 President Obama’s fossil fuel subsidy elimination requests
(millions of US dollars)

	2020	
	FY 2011	FY 2012
Coal tax preferences	281	303
Expensing of exploration and development costs	32	45
Percentage depletion for hard mineral fossil fuels	123	154
Capital gains treatment for royalties	119	55
Domestic manufacturing deduction for hard mineral fossil fuels	7	49
Oil tax preferences	3,764	4,030
Enhanced oil recovery credit	—	—
Credit for oil and gas produced from marginal wells	—	—
Expensing of intangible drilling costs	310	523
Deduction for tertiary injectants	6	9
Exception to passive loss limitations for working interests in oil and natural gas properties	16	16
Percentage depletion for oil and natural gas wells	1,226	1,273
Domestic manufacturing tax deduction for oil and natural gas companies	2,188	2,200
Increase geological and geophysical amortization period for independent producers to seven years	18	9
Modified tax rules for dual capacity oil and gas companies*	700	700
Total fossil fuel tax preferences	4,745	5,033

FY = fiscal year

*“Ending Tax Breaks for Big Oil: Reducing Deficit Without Increasing Prices at the Pump,” US Congress Joint Economic Committee, 2011 citing a Joint Committee on Taxation estimate. The report only lists a cumulative FY 2013–FY 2021 estimate of \$6.1 billion from which we estimate roughly \$700 billion would occur in FY 2020.

Source: OMB (2010), OMB (2011), JEC Chairman’s Staff (2011).

Table 4 US share of MDB headroom available for climate finance (billions of US dollars in 2020)

	US Share	
	Gross	Net*
IFC	1.56	0.66
IBRD	5.77	2.43
EBRD	0.28	0.12
AsDB	0.79	0.33
AfDB	0.18	0.08
IADB	1.32	0.56
MDB Total	\$9.90	\$4.20

MDB = Multilateral Development Banks

* this is an absolute upper bound estimate of the “grant equivalent” of the gross flows

Source: IFC (2010), European Investment Bank (2009), AfDB (2009), ADB (2010), EBRD (2011), IADB (2010), IBRD (2010), EIU (2011).

Table 5 Summary of US climate finance options

New and additional annual financing by 2020	Revenue potential (US billions of dollars)	Legislative action	International coordination	US politics (1 = easy, 5 = hard)	Global politics (1 = easy, 5 = hard)
Direct budget contributions	1.3–2.2	Appropriation	Optional	4	1
Carbon revenue	1.2–16.2	Cap-and-trade or carbon tax	Optional	5	1
International offsets	Gross: 3.4–47.7 Net: 1.3–32	Cap-and-trade	Preferable	5	3
Fossil fuel subsidies	4–5	New legislation and appropriation	Optional	3	2
Border carbon adjustments	2.7–5.4	Cap-and-trade, carbon tax or EPA regulation	Highly preferable	4	4
International transport	7.1–14.2	New legislation and appropriation	Highly preferable	3	4
Financial transaction tax	100–115	New legislation and appropriation	Highly preferable	3	4
Multilateral Development Banks	Gross: 9.9 Net: 4.2	None	Required	1	2
Bilateral credit agencies	Gross: 9.4–12.9 Net: 0.7–3.6	Authorization	Preferable	2	3

EPA = Environmental Protection Agency