



## CRS Report for Congress

# The World Bank's Clean Technology Fund (CTF)

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### Summary

The United States Treasury has led efforts to create a \$10 billion Clean Technology Fund (CTF), located at the World Bank, to help fund deployment of clean technology to reduce greenhouse gas emissions in developing economies. The Bush administration has asked Congress to authorize and appropriate U.S. funding of \$2 billion over three years (FY2009 to FY2011). While many Members of Congress have expressed support for the CTF, others have raised concerns, primarily with respect to whether the CTF should finance carbon-based energy projects. To date, Congress has not passed legislation authorizing or appropriating U.S. contributions to the Fund. This report will be updated as events warrant.

In February 2008, Japan, the United Kingdom, and the United States announced their intention to create a set of funds at the World Bank to help developing countries “bridge the gap between dirty and clean energy” and “boost the World Bank’s ability to help developing countries tackle climate change.”<sup>1</sup> The World Bank held the first design meeting for the proposed climate investment funds in March 2008 in Paris, France. Second and third meetings were held in Washington, DC in April 2008 and Berlin, Germany in May 2008. On May 23, 2008, representatives from 40 developing and industrialized countries reached agreement on the Fund’s design. At the September 2008 pledging conference, \$6.2 billion was pledged to the two funds, with over \$5.0 billion for the Clean Technology Fund (CTF) alone.

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<sup>1</sup> Henry Paulson, Alistair Darling and Fukushima Nukaga, “Financial bridge from dirty to clean,” *Financial Times*, February 7, 2008.

The aim of the CTF is to slow the growth of greenhouse gas (GHG) emissions in developing countries by helping fund the costs of transitioning to low-carbon economic growth. This would be accomplished by helping developing countries deploy commercially available cleaner technologies instead of cheaper, higher GHG emitting alternatives, such as traditional coal-fired power plants. The World Bank hopes to secure \$10 billion for the CTF. The Bush administration has asked Congress to authorize and appropriate U.S. funding of \$2 billion over three years (FY2009 to FY2011). As the first contribution toward this pledge, the Administration has requested appropriations of \$400 million in the FY2009 Treasury International Programs request.<sup>2</sup>

## The World Bank and Climate Change

The core mission of the World Bank is sustainable economic growth and poverty reduction. Some view climate change mitigation and adaptation as part of this agenda since the least developed countries are disproportionately impacted by the negative effects of climate change due to rising sea levels, temperatures, droughts, changes in rainfall patterns, access to drinkable water, and disease patterns. Thus, the World Bank has increased its efforts over the past two decades to prepare environmental assessments for its projects and provide developing countries greater access to finance and technology for climate change mitigation efforts.<sup>3</sup> However, in 2005, the World Resources Institute (WRI), an environmental think tank, estimated that climate change mitigation was considered in less than 20% of the World Bank's energy sector lending.<sup>4</sup>

At the 2005 Gleneagles Summit, the Group of Eight (G8) countries launched an initiative focusing on climate change, clean energy, and sustainable development. By creating a forum outside of the formal United Nations Framework Convention on Climate Change (UNFCCC) process, the G8 aimed to quickly increase transfer of technology to poor and developing countries and to help them increase energy access while lowering GHG emissions.<sup>5</sup> At the Summit, the G8 and the so-called +5 countries (Brazil, China, India, Mexico, and South Africa) agreed on the Gleneagles Plan of Action on Climate Change, Clean Energy, and Sustainable Development. The World Bank was asked as part of that plan to work with other multilateral development banks (MDBs) to, among other tasks, "make the best use of existing resources and financing instruments and develop a framework for energy investment to accelerate the adoption of technologies which enable cleaner, more efficient energy production and use." In 2007, the Bank began developing a "Strategic Framework on Climate Change and Development."<sup>6</sup>

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<sup>2</sup> FY2009 Budget Request, Treasury International Programs: Justification for Appropriations.

<sup>3</sup> See CRS Report 98-180F: *Multilateral Development Banks' Environmental Assessment and Information Policies: Impact of the Pelosi Amendment*, by Jonathan Sanford and Susan R. Fletcher.

<sup>4</sup> Jon Sohn, Smita Nakhooda, and Kevin Baumert, "Mainstreaming Climate Change at the Multilateral Development Banks," *World Resources Institute*, 2005.

<sup>5</sup> For more information on the UNFCCC, see CRS Report RL33826: *Climate Change: The Kyoto Protocol, Bali 'Action Plan,' and International Actions*, by Susan R. Fletcher and Larry Parker.

<sup>6</sup> Towards a Strategic Framework on Climate Change and Development for the World Bank Group: Concept and Issues Paper, The World Bank, March 27, 2008.

Since January 2008, the United States has led efforts to create a \$10 billion CTF, located at the World Bank, to help fund deployment of clean technology to reduce GHG emissions in developing economies, primarily large growing economies such as China and India. The incremental carbon dioxide (CO<sub>2</sub>) emissions from China and India alone have accounted for an estimated 62% of new global emissions from 2000 to 2006, and are projected to account for over half of all future global emissions through 2030.<sup>7</sup> Research suggests that under current conditions, emerging market countries' emissions will probably exceed those of developed countries by 2025.<sup>8</sup> Without transformation in China, India and other emerging economies, it will be very difficult to achieve a meaningful global reduction in GHG emissions.

According to the World Bank, potential sectors for CTF investments are in the power sector (renewable energy, as well as increased efficiency in generation, transmission and distribution); transportation (modal shifts to public transportation, improved fuel economy, and fuel switching); and large scale adoption of energy efficient technologies in the industrial, commercial and residential building sectors.<sup>9</sup> While the costs of embracing clean technology may be prohibitive for many poor and developing countries, agreement by developing countries to reduce their GHG emissions is becoming increasingly central to any post-2012 agreement on global climate change efforts.<sup>10</sup> Many countries thus believe that the CTF would help engage the large emerging market countries, such as China and India, in the runup to the 2009 Copenhagen conference.<sup>11</sup>

If funded, the CTF would invest in country-identified sector and program priorities that lead to the “demonstration, deployment and transfer of low carbon technologies with a significant potential for long term greenhouse gas emissions savings.”<sup>12</sup> The CTF would be “technology neutral,” financing technologies ranging from solar thermal and wind power, to nuclear and clean-coal. While the CTF would be administered by the World Bank, it is expected to co-finance projects with bilateral donors, the regional development banks (African Development Bank, Inter-American Development Bank, Asian Development Bank, and the European Bank for Reconstruction and Development), and the private sector.

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<sup>7</sup> *World Energy Outlook 2007: Focus on China and India*, International Energy Agency, 2007, p. 54. See also CRS Report RL32721, *Greenhouse Gas Emissions: Perspectives on the Top 20 Emitters and Developed Versus Developing Nations*, by Larry Parker and John Blodgett.

<sup>8</sup> David Wheeler and Kevin Ummel, “Another Inconvenient Truth: A Carbon-Intensive South Faces Environmental Disaster, No Matter What the North Does,” Center for Global Development, working paper Number 134, December 2007.

<sup>9</sup> The Clean Technology Fund, The World Bank, June 3, 2008.

<sup>10</sup> The first commitment period of the Kyoto Protocol runs from 2008-2012. Global commitments negotiated under the Protocol will need to be revisited for subsequent commitment periods. For more information, see CRS Report RL33826: *Climate Change: The Kyoto Protocol, Bali ‘Action Plan,’ and International Actions*, by Susan R. Fletcher and Larry Parker.

<sup>11</sup> Yasuo Fukuda, “Environment and Climate Change,” Hokkaido Toyako G-8 Summit, July 8, 2008. At the 2009 Copenhagen climate conference to be held between November 30 and 11 December, 2009, the parties of the UNFCCC will meet for the last time on a governmental level before the Kyoto climate agreement expires.

<sup>12</sup> “The Clean Technology Fund,” The World Bank, June 3, 2008.

The costs to developing countries of switching to clean technologies without financial assistance could be prohibitive. According to the International Energy Agency (IEA), an additional global energy investment of \$9.3 trillion would be needed between 2008 and 2030 to keep atmospheric CO<sub>2</sub> levels below 450 parts per million (to keep global warming under 2 degrees Celsius).<sup>13</sup> IEA analysis suggests that to achieve this goal, low-carbon energy needs to account for 36% of the global primary energy mix by 2030. According to IEA Executive Director, Nobuo Tanaka, to achieve this outcome, “we would need concerted action from all major emitters. Our analysis shows that [Organization for Economic Cooperation and Development] countries alone cannot put the world onto a 450-ppm trajectory, even if they were to reduce their emissions to zero.”<sup>14</sup> U.S. policymakers therefore believe that the CTF may be a way to provide financial incentives to developing countries to help defray the cost of energy technologies that are cleaner than traditional coal use. Prior to any U.S. contributions to the new Fund, congressional authorization and appropriations are required. Requests for authorization of the CTF and appropriations of \$400 million are included in the FY2009 budget request. This funding would be additional to existing U.S. appropriations to the World Bank’s low-income lending facility, the International Development Association (IDA) and the Global Environment Facility (GEF).

The U.S. contributions to the CTF would help meet obligations under the United Nations Framework Convention on Climate Change, in which developed countries pledged to provide “new and additional” “financial resources, including for the transfer of technology, needed by the developing country Parties...” (Art. 4.3) Proponents of the CTF argue that the fund would enhance incentives to developing countries to mitigate GHG emissions and help secure their commitments to abatement in a post-Kyoto international climate change agreement.<sup>15</sup> Concerns about the CTF, however, have been raised by policymakers and non-governmental organizations (NGOs), primary of which is whether the CTF should fund coal-fired power plants.

## **Should the CTF Fund Coal Plants?**

The primary concern raised in Congress about the CTF involves the types of “clean” technologies the World Bank may support. Several Members have questioned whether the CTF should be “technology neutral,” thus allowing CTF resources to fund carbon-based investments. This was the central debate during a June 5, 2008 House Financial Services Committee hearing on the CTF.

A central criticism of the CTF raised by environmental NGOs is that it could be used to promote coal-based power generation options with only marginal reductions in GHG emissions. These critics claim that supercritical and ultra supercritical coal plants —

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<sup>13</sup> Avoiding 2°C of human-induced global warming is an aggressive policy goal championed by the European Union and a number of other countries and non-governmental organizations.

<sup>14</sup> “New Energy Realities — WEO Calls for Global Energy Revolution Despite Economic Crisis,” International Energy Agency, November 12, 2008.

<sup>15</sup> See Fletcher and Parker, *op. cit.*

compared to the less efficient class of subcritical plants — are not transformational.<sup>16</sup> Additionally, these more efficient technologies are increasingly the preferred choice in many developing country markets as coal prices and equipment costs rise. If these plants were to be built by the private sector anyway, why should they receive multilateral funding? Critics claim that these plants lock in intensive carbon dioxide emissions for decades to come. They generally argue that renewable energy options — with zero carbon dioxide emissions — are a better target for multilateral development agency incentives.

However, many developing countries and multilateral development agencies are concerned that renewable energy, such as concentrating solar power, wind, and biofuels, may not sufficiently meet the growing demand for electricity in an affordable and reliable manner. Many developing countries view renewable alternatives with skepticism, especially if they are not already widely used in industrialized economies. Until these cleaner technologies are commercially deployed in developed countries, potential recipients in developing countries will likely continue to prefer more traditional coal-based options, even if the environmental consequences are more damaging.

An example helps to illustrate the debate noted above. The International Finance Corporation (IFC) recently voted to help finance a 4,000 megawatt supercritical coal plant in Gujarat, India. The IFC notes that the project would result in 70% fewer greenhouse gas emissions than typical coal plants in India, and that it is the first project in India to use 800 megawatt supercritical technology. Critics of the CTF note that projects like this still result in very significant CO<sub>2</sub> emissions. According to one analyst, no carbon accounting framework is used in the financing decision, and that using one would result in very competitive costs between coal and other zero-emission options such as concentrating solar power.<sup>17</sup> He also argues that supercritical coal plants have been built in India and that many more projects are under development. Thus, he believes that CTF financing may not be critical to the development or initiation of this approach.

Some supporters note that the CTF could accelerate deployment of carbon capture and storage (CCS), which enables the capture and underground storage of CO<sub>2</sub> emissions from fossil fuel combustion plants. According to the World Bank, however, CCS is not a currently viable technology, and thus is not eligible for CTF financing. Critics disagree however, about the viability of CCS technology.<sup>18</sup> According to the IEA, CCS in the power sector could account for 8%-10% of global GHG emissions reductions by 2050<sup>19</sup> while allowing CCS in the power sector could enable coal-fired combustion to continue

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<sup>16</sup> The more efficient supercritical and ultra supercritical plants, which operate at about 39-43% efficiency compared to 34-36% for subcritical units, offer only modest greenhouse gas reductions. Carbon dioxide emissions from power plants are directly proportional to efficiency, so a plant going with an 18% absolute increase in efficiency would produce 18% less carbon dioxide. These are the higher heating value (HHV) thermal efficiency rates, not be confused with lower heating value (LHV) efficiencies. See *The Future of Coal*, MIT, 2007, Table 3.1, p. 19.

<sup>17</sup> David Wheeler, “World Bank Power Projects: Crossroads on Renewable Energy,” Center for Global Development, May 5, 2008.

<sup>18</sup> See CRS Report RL33801, *Carbon Capture and Sequestration (CCS)*, by Peter Folger.

<sup>19</sup> “CO<sub>2</sub> Capture and Storage: A key carbon abatement option,” International Energy Agency 2008.

to provide reliable, dispatchable base-load power. This is particularly true for China and India, the largest and third-largest coal users in the world, respectively.

There are, however, many disadvantages to CCS. First, it is unproven at commercial scale in the power sector. To date, there is only one integrated, operating CCS coal-fired power plant, Vattenfall's 30MW Shwarze Pumpe plant in Germany. In addition, CCS is very expensive relative to conventional coal-fired power, in large part due to the energy penalty, or reduction in efficiency to power the capture technology. Integrated gasification combined cycle (IGCC) plants with CCS, the most cost-effective application, is estimated to be 75%-100% more expensive than conventional power today. CTF funding may speed deployment of CCS in developing countries. On the other hand, developing economies may react negatively if they perceive that the rich world is withholding CTF financing for needed investment in efficient fossil fueled power plants in favor of an unproven technology that the rich world itself is only tepidly embracing.<sup>20</sup>

## Congressional Action

To date, several pieces of legislation have been introduced in the 110<sup>th</sup> Congress that would authorize U.S. participation in the CTF and begin appropriations on U.S. contributions to the Fund. The most recent to be introduced is H.R. 7160, *To authorize United States participation in, and appropriations for the United States contribution to, an international clean technology fund, and for other purposes*, on September 28, 2008. This legislation would restrict the World Bank's use of U.S. funds for coal-intensive investments unless they incorporated CCS technology and use ultra-supercritical coal technology. In addition, H.R. 7160 seeks to require the multilateral development banks to implement a greenhouse gas accounting method. To date, the World Bank has been resistant to introducing such measures due to what they argue are various technical and political obstacles.<sup>21</sup> No action has been taken on this legislation in the 110<sup>th</sup> Congress. It is expected that H.R. 7160 will be reintroduced in the 111<sup>th</sup> Congress, especially as international negotiations proceed toward a deadline of the end of 2009 to agree on post-2012 actions to address climate change.<sup>22</sup>

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<sup>20</sup> For reports on carbon capture and sequestration technology and policy issues, see the CRS Current Legislative Issues webpage on Climate Change [http://apps.crs.gov/cli/cli.aspx?PRDS\\_CLI\\_ITEM\\_ID=2645&from=3&fromId=2522](http://apps.crs.gov/cli/cli.aspx?PRDS_CLI_ITEM_ID=2645&from=3&fromId=2522)].

<sup>21</sup> Two concerns regarding carbon accounting are: (1) what methodology should be used to determine a shadow price for carbon and (2) developing countries have been resistant to introducing shadow pricing for carbon since they believe it may restrict their access to World Bank financing.

<sup>22</sup> "Introduction of International Clean Technology Fund Legislation Announced," Office of Congresswoman Gwen Moore, September 27, 2008.