



Should Congress Authorize a Multilateral Clean Technology Fund?

Should the World Bank Administer It?

Statement before the U.S. House of Representatives Financial Services Subcommittee on

Domestic and International Monetary Policy, Trade, and Technology on

"Examining the Administration's Proposal to Establish a Multilateral Clean Technology Fund"

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Thank you Chairman Gutierrez, Congressman Paul and distinguished members of the subcommittee for inviting me to participate in today's hearing.

I would like to begin with a brief tale of two possible clean technology funds, whose different consequences will have enormous implications for our children and grandchildren. Imagine, if you will, that it is now 2015, seven years after the creation of a multilateral fund for clean technology. In Scenario 1, the World Bank's Clean Technology Fund (CTF) has provided developing countries with billions of dollars to make coal-fired power plants and other energy projects marginally more efficient, but has done little to stem the alarming rise in greenhouse gas (GHG) emissions. The catastrophic nature of rapid climate change, including droughts, floods, fires, falling agricultural productivity, and a swelling tide of climate refugees, is increasingly evident and universally understood. But precious time has been lost. We are on course for a planetary disaster.

In Scenario 2, the U.S. Congress, led by the decisions of this committee, has insisted that the World Bank use the Clean Technology Fund to catalyze deployment of climate-friendly renewable energy on a very large scale. Private companies competing for billions of dollars in World Bank-funded contracts have rapidly driven down the cost of zero-carbon electricity. Renewable energy options such as solar thermal power are now cheaper than coal and other fossil fuels, and provide a growing share of base load power around the world. Seven years later, we are on course for a major success in the struggle against climate change.

Both scenarios are utterly plausible. The decisions that this committee makes will determine which path we follow. Do we collectively have the strategic vision to seize this enormous opportunity? If we fail, future generations—including our own grandchildren—will surely ask: “Why didn't they do something more?”

WHY WE NEED THE CLEAN TECHNOLOGY FUND

1. The Climate Crisis

U.S. leadership in the creation of a well-designed Clean Technology Fund is crucial. If humanity is to avoid potentially-catastrophic climate change, rapid reductions in greenhouse gas emissions must occur in the very near term. Global carbon dioxide (CO₂) emissions from the combustion of fossil fuels are now exceeding even the most pessimistic scenarios produced by the Intergovernmental Panel on Climate Change (IPCC) in the late 1990's (Raupach et al., 2007). At the same time, observed climate change is occurring more quickly than previously expected. Paleoclimatic evidence suggests that preserving a climate congenial to civilization will ultimately require atmospheric CO₂ concentrations to decline from present levels (~385 ppm, rising by 2+ ppm annually) to no higher than 350 ppm (Stroeve et al., 2007; Hansen et al., 2008).

Uncertainties about short-term climate sensitivity and the precise timing of global warming do not imply that we should wait until further evidence is available. Rather, they highlight the necessity of immediate action to counter the risks inherent in the climate system by bringing down emissions.¹ Business-as-usual scenarios suggest energy-related emissions could be 37-40 gigatons (Gtons) CO₂ by 2025.² Given a range of short-term temperature and long-term concentration objectives, basic emissions modeling suggests that an aggressive short-term target could reduce fossil fuel CO₂ emissions by one-third, to 25 Gtons in the same time period.³

¹ See: http://blogs.cgdev.org/globaldevelopment/2008/03/the_dismal_climate_science_on_1.php

² Low-end estimate from EIA (2007) reference case projection. High-end estimate takes projected annual rate of emissions growth from McKinsey (2007) and extrapolates to 2020. Both assume a global GDP growth rate of 3.2% annually (market exchange rates).

³ Based on modeling using the SiMCAp EQW-PATHFINDER program developed by Malte Meinshausen and Bill Hare (www.simcap.org). Objectives included combinations of: average warming below 2C over preindustrial levels, peak concentration of 425 ppm, and long-term stabilization at 350 ppm. See also Baer and Mastrandrea (2006) and Meinshausen (2005) for more on emissions pathways and the probability of dangerous climate change.

2 The Urgency of Low-Carbon Electric Power for Developing Countries

Inexpensive low-carbon electricity, especially for the developing world, must be a part of any plan for addressing climate change for four reasons.

- First, international negotiations and national GHG emission targets in the U.S. and other rich countries cannot achieve the necessary reductions in CO₂ and other greenhouse gases. As you know, the Senate has just begun to consider ambitious cap-and-trade legislation, and even optimists do not expect the legislation to be enacted soon. If the U.S. and European Union succeed in implementing current proposals, and other developed countries respond similarly, total fossil-fuel CO₂ emissions from Kyoto Protocol Annex 1 countries in 2020 could be as low as 10 gigatons (Gtons).⁴ In that case, an overall global target of 25 Gtons would leave 15 Gtons for low- and middle-income countries, the non-Annex 1 countries in the Kyoto Protocol. But current emissions from the developing world are already about 14 Gtons CO₂ and possibly higher, so energy-related emissions in these countries would have to flat-line between now and 2020 to achieve the overall target. This is clearly unrealistic given existing economic realities, social equity considerations, and the fact that developing countries show no indication of submitting to binding reductions. National emission targets are indisputably valuable, especially as signals of political commitment, but they have little chance on their own of meeting sufficiently aggressive short-term goals.
- Second, it is unreasonable and, in many respects, unfair to expect people in the developing world to restrain the growth in their energy consumption, which

⁴ Emissions figures presented here are extracted from International Energy Agency data. The 10 Gton CO₂ figure assumes the EU reduces emissions 30% below 1990 levels and the U.S. and other Annex 1 countries reduce emissions by about 20% from 2005 levels by 2020.

continues to be just a tiny fraction of per-capita consumption in the U.S. and other rich countries. Moreover, whatever our views on this, the G77 and China have steadfastly insisted on this position in UN negotiations. At the same time, emissions from the developing world, even at low levels of per-capita consumption, are enough to create a climate crisis irrespective of the rich world's carbon legacy (Wheeler and Ummel 2007).

- Third, greatly increased zero-carbon electricity production is urgently needed to replace liquid fossil fuels used in transportation and other sectors. While cellulosic ethanol and other future biofuels may eventually contribute to a climate solution, current-generation biofuels may actually be accelerating climate change because producing them requires large amounts of fossil fuel and encourages more tropical deforestation. Moreover, as we have seen in recent weeks, using scarce cropland to produce ethanol for cars undermines our efforts to fight global hunger.
- Finally, even if we assume large energy conservation and efficiency improvements, shifting the global electric power sector to low- and zero-carbon systems provides the best opportunity to reduce carbon intensity quickly. Power and heat generation are responsible for over 27% of total CO₂ emissions, and the proportion is rising (IPCC, 2007). Focused programs for rapid improvement can work in this sector, because power-related emissions and corporate ownership are highly concentrated, and several clean energy technologies are relatively mature.

3. The Clean Technology Fund Can Finance the Transition to Clean Electricity

Given the importance of a rapid transition to climate-friendly power generation, the Bush Administration deserves credit for its leadership in proposing the Clean Technology Fund (CTF)

as a unique vehicle for promoting clean energy in developing countries. Moreover, the leadership of this committee deserves our thanks for asking how the CTF would actually function. Make no mistake: The Clean Technology Fund is urgently needed, and it can pay a massive return for American taxpayers and people around the world. But the CTF must be used strategically because, even if donor countries contribute tens of billions of dollars, the fund will be tiny compared to the capital requirements for retooling the power sector.

By 2020, perhaps one-quarter of existing generating capacity will need to be replaced and an additional 1400 gigawatts (GW) installed to meet new demand. If current trends continue, electricity will represent nearly 20% of total consumed energy in 2020 and possibly far more, if heating, transportation, and industrial demands evolve from direct fuel combustion to the use of electricity. Given these considerations, meeting short-term emissions goals will require a vast, rapid expansion of cheap, renewable electricity coupled with energy efficiency improvements and a rapid transition to widespread electricity use.

The most difficult part of the needed transition will be provision of reliable and carbon-free electricity at prices significantly lower than that of fossil-fueled generation. In February of this year, the Finance Ministers of the U.S., UK, and Japan acknowledged this need by proposing a Clean Technology Fund (CTF) to “help developing countries bridge the gap between dirty and clean technology.” The initial U.S. contribution was originally estimated to be \$2 billion over three years, subject to congressional authorization and appropriation (Paulson et al., 2008). It is expected that the international component of the UK’s Environmental Transformation Fund (\$1.5 billion over three years) and part of Japan’s Cool Earth Partnership (\$10 billion over five years) will be made available to the fund. Allocation of financing has been provisionally

assigned to the World Bank, which is still working on its final proposal for management of the CTF.

Current market conditions are extremely favorable for low-cost subsidization of clean energy, because the cost gap between clean and dirty technologies has narrowed considerably in just the last year. The prices of fossil fuels – most importantly coal – are at record-high levels as global demand increases far faster than supply can grow in the short term. The rise in international coal prices is akin to the imposition of a \$30-per-ton CO₂ tax since early 2007. Accurate accounting of fuel prices moves many renewable technologies much closer to cost-competitiveness with fossil fuels.

We cannot count on continued price increases for fossil fuels to close the remaining gap, and most developing countries will not enact regulations to raise the price of carbon emissions in the near future. We therefore have only one realistic route to closing the gap and meeting critical short-term emissions targets: *The Clean Technology Fund (CTF) must be focused on making renewable energy cheaper than energy from fossil fuels (particularly coal).*

Without this strategic focus on cost reduction, there is no compelling rationale for the CTF. It should therefore focus explicitly on pushing key technologies down learning/cost curves as quickly as possible. Observed learning rates for renewable technologies are generally in the range of 10-20%, meaning that each doubling of installed capacity reduces the cost of production by 10-20% (Neij, 2008). For technologies starting at low levels of deployment, significant price reductions can be achieved in short periods of time as manufacturing scales increase, efficiencies improve, and price premiums associated with new-technology risk subside.

Solar thermal power provides a useful illustration, because it is one of the most promising renewable options for base load power. Solar thermal power (STP) uses direct sunlight and

mirrors to heat liquids, whose expansion drives high-efficiency electric generators. The generating potential of STP is nearly limitless, and the materials and processes required are relatively simple and well understood. Recent advances allow cost-effective storage of excess thermal energy during the day, so that generation can continue at night. A recent study indicates that public financing through the CTF can close the cost gap between solar thermal and coal-fired power in a 5-10 year program that expands capacity at 500-1000 MW/year (Wheeler and Ummel, 2008). We estimate that total Clean Technology Fund subsidies for this program would be \$4 - \$8 billion – easily within range for a serious multilateral effort.

SHOULD THE WORLD BANK MANAGE THE CLEAN TECHNOLOGY FUND?

1. The World Bank's Record to Date

The value of a single multilateral fund lies in its ability to leverage contributions from a range of donors, but this must be weighed against legitimate concerns about objectives and management strategy. Meeting future energy demand will require \$20 trillion in infrastructure investments between now and 2030, half of it in the developing world (IEA, 2006). Public financing through the Clean Technology Fund will never be more than a small fraction of overall investment in the global energy sector. If the World Bank administers the CTF, its policies will therefore be critical in determining the scale of private-sector adoption of clean energy technologies. Unfortunately, its recent record is not encouraging.

First, the World Bank's continued support for huge coal-fired power plants suggests that it is not yet serious about catalyzing the transition to clean energy. In April, the World Bank Group's private-sector arm, the International Finance Corporation (IFC), approved \$450 million in financing for the 4,000 MW coal-fired Tata Ultra Mega power plant in India's Gujarat State.

The projected CO₂ emissions of this plant are 25-28 million tons per year, making it one of the world's largest point sources of global warming pollution upon completion (CARMA, 2008).

The project approval process for Tata Ultra Mega clearly suffered from out-dated cost assessments, faulty reasoning, and a lack of due diligence in identifying clean alternatives with higher net social benefits.⁵ The IFC claims that its financing was required to ensure the use of marginally-cleaner supercritical (SC) coal combustion technology. In truth, the higher efficiency of SC technology makes it the cheapest way to produce coal-fired electricity at current coal prices, and companies in India are constructing SC power facilities without the use of scarce international financing.

Similar problems are apparent in the World Bank's consideration of financing for the 2,000+ MW Mmamabula coal-fired plant in Botswana. Again, the use of marginally-cleaner SC technology provides the main rationale, despite its being preferred by the private sector on the basis of cost alone.

Second, the World Bank's failure to adopt carbon accounting indicates that it is not yet prepared to think strategically about emissions reduction and unable to judge its progress toward that objective. Sometimes referred to as carbon shadow pricing, carbon accounting incorporates an estimated dollar cost, or charge, for every ton of CO₂ emitted by a proposed investment project. Several major U.S. investment banks have already extended their conventional cost accounting to include carbon charges for their analyses of energy project proposals.

Unfortunately, no such accounting policy currently exists at the World Bank.

To illustrate the implications of this failure, a recent analysis shows that incorporating even moderate carbon pricing into appraisal of the Mmamabula coal-fired power project would make

⁵ See: http://blogs.cgdev.org/globaldevelopment/2008/03/tata_ultra_mega_mistake_the_if.php

it preferable to invest in superior, clean alternatives (Wheeler, 2008). Even assuming lower-than-present coal prices, the pricing of carbon at approximately \$35 per ton would prompt investors to consider switching to renewable solar thermal technology. For comparison, the current price of CO₂ emissions in the EU's Emissions Trading System is about \$41/ton.⁶

As this example shows, the use of carbon accounting could greatly accelerate the adoption of renewable energy. In fact, the areas associated with both the Mmamabula and Tata Ultra Mega coal-fired power projects have plentiful solar energy.⁷ Even in a densely-populated country like India, about 16,000 square kilometers (6,200 square miles) of barren land are suitable for solar thermal power production. This amount of land could conservatively generate 3.8 million gigawatt hours of electricity annually – more than five times India's current power production. Solar potential in other countries, including China, is even greater.

The per-ton charge required to facilitate a switch to renewable alternatives is well within the range of the estimated social costs of climate change, which will be borne primarily by citizens of the developing world. That the World Bank has no policy for, or experience with, incorporating such considerations into project appraisal is worrying, especially given its role as an investor of donor dollars for projects intended to improve the welfare of the world's poor. In the wake of these findings, a discussion has begun within the Bank on the topic of carbon pricing, but our sense is that bureaucratic inertia on this issue is considerable.

⁶ Daily quotes are available at www.pointcarbon.com.

⁷ See: http://blogs.cgdev.org/globaldevelopment/2008/02/a_solar_future_for_the_world_b.php

2. The World Bank's Draft Proposal for CTF Management

The World Bank's own draft proposal for administering the Clean Technology Fund (World Bank, 2008) fails to recognize the necessity of either strategic focus on cost-competitive renewable energy or carbon accounting. Instead, it accommodates a very broad range of options, including supercritical coal projects, that will not put specific renewable technologies on the path to cost-competitiveness with fossil fuels. This approach will perpetuate the cost gap, ensure a continued dominant role for coal and other fossil fuels in developing countries, and eliminate the possibility of meeting critical emissions targets within the relevant time frame. The World Bank's proposal also makes no commitment to carbon accounting. It avoids any mention of carbon pricing, and its only explicit mention of emissions accounting is in a footnote about future methodology.⁸

These deficiencies suggest that the multiple agendas of the World Bank's diverse constituencies may prevent it from administering the Clean Technology Fund successfully. A close reading of the World Bank's successive CTF proposal drafts (four have been issued since April 3, the most recent on June 3) reveals the lack of a clear strategic vision, and a drift in the language as different constituents weigh in. For example, the April 29 draft required investments to be part of "country-owned strategy" in pursuit of a "transformational shift" toward a "low-carbon development path," while the May 15 draft, undoubtedly responding to constituents with more conventional concerns, called for investment plans to be "embedded in nationally-appropriate mitigation actions by the country in the context of sustainable development, taking into account the priorities of economic growth and poverty reduction and increased access to

⁸ "A methodology will be developed to take into account direct emissions savings from the project itself, potential emissions savings from replication through demonstration, and the potential for wider emissions savings as a result of policy and regulatory change." (World Bank, 2008).

energy for the country.” Further pressure from the climate constituency led to reassertion of low-carbon terminology in the June 3 draft.

One gets the sense that the Bank doesn't know what to do -- and it doesn't want to scare off its donors or clients -- so it is casting as wide a project net as possible. This is unfortunate, because only a well-conceived strategy that goes beyond a project-level approach to focus on dynamic programs and technological learning is capable of delivering the mitigation needed to avoid runaway global warming. The June 3 draft alludes to such programs, but only as one of myriad options for financing. I believe the World Bank cannot pursue the critical objectives of the CTF if fails to provide the strategic leadership necessary to make such truly transformative impacts a reality.

Recommendations for Congress

The World Bank's most recent (June 3) proposal for the CTF cannot accomplish the fund's mission, because it lacks a focus on cost-competitiveness for renewables; fails to commit to carbon accounting; and leaves open the door to financing coal-fired power projects, even without carbon capture and sequestration (CCS). Fortunately, Congress can intervene: It has enormous leverage because the World Bank's management views the CTF as critical for the institution's future. I believe that Congress can help make the Clean Technology Fund a successful investment of taxpayer dollars by setting the following conditions for authorization.

1. Congress should not agree to provide American taxpayer support for the CTF as it is currently proposed. Instead, Congress should instruct the U.S. Treasury to inform World Bank management that U.S. support will only be forthcoming if the proposal is revised to ensure strategic use of the CTF to make zero-emissions renewable energy cost-competitive with energy from fossil fuels.

2. To do this, the CTF must focus on renewables that have the potential to be cost-competitive within a few years, and exclude projects that merely improve fossil-fuel combustion efficiency. In particular, the CTF should exclude all proposals for coal-fired power.⁹

3. The revised proposal must include a commitment by the World Bank to adopt carbon accounting as rapidly as possible; certainly no later than within a year of CTF authorization and before any funds are actually disbursed. Without carbon accounting, the World Bank cannot select the most cost-effective projects, track progress on emissions reduction, or fulfill the Clean Technology Fund's mandate of helping developing countries bridge the gap between dirty and clean technology.

In closing, U.S. leadership in the creation of a multilateral Clean Technology Fund is laudable, and indeed essential in the global effort to prevent rapid, catastrophic climate change. But a badly-designed fund will be worse than no fund at all, because it will dissipate scarce resources while making it more difficult to set up an effective alternative. The World Bank has the technical staff to produce a well-designed CTF proposal, if the U.S. Congress makes it clear that the American people expect this in exchange for their contribution. However, if the World Bank's management is unable to comply in a timely fashion, then the U.S. should look elsewhere for a more qualified organization to administer this multibillion dollar fund.

⁹ Some look to carbon capture and sequestration (CCS) as an alternative to eliminating coal altogether. However, the technical and economic prospects for widespread use of CCS within the coming decade are limited and uncertain. Moreover, because coal with CCS will always cost more than coal without CCS, and given the likelihood of sustained high coal prices over the next decade, technologies such as wind and solar are better bets for a strategically-focused CTF.

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