

# CLIMATE INVESTMENT FUNDS

CTF/TFC.2/3  
January 16, 2009

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Meeting of the CTF Trust Fund Committee  
Washington, D.C.  
January 29-30, 2009

## **CLEAN TECHNOLOGY FUND INVESTMENT CRITERIA FOR PUBLIC SECTOR OPERATIONS<sup>1</sup>**

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<sup>1</sup> These criteria are applicable to public sector projects. For private sector projects, please see CTF Private Sector Operational Guidelines.

## **Introduction**

1. Among the functions of the Clean Technology Fund (CTF) Trust Fund Committee is “approving programming and pipeline priorities, operational criteria and financing modalities.” At its organizational meeting in October 2008, the Trust Fund Committee agreed to review and approve at its meeting in November 2008 proposed criteria to allow a generic assessment of the transformative potential of proposed investment plans, programs and projects, consistent with the objectives of the CTF.

2. As agreed in the final design of the CTF, this paper proposes criteria to assess and prioritize proposed programs and projects in investment plans. Recognizing that the CTF is to promote learning-by-doing, it is proposed that the criteria be kept under review by the Trust Fund Committee on the basis of actual experience in their application and that the MDBs prepare a report for consideration by the Committee within the next 18 months to allow of the consideration of any changes that would serve to enhance the effectiveness of criteria.

3. The Committee reviewed the criteria proposed in document CTF/TFC.1/3 and approved the paper, with the exception of paragraph 7 (paragraph 8 in this document), subject to the revisions proposed by the Committee. The Secretariat was requested to revise the paper on the basis of the Committee’s discussion and to circulate the revised paper to the Committee Members for further comment. Members were invited to submit additional comments to the Secretariat for inclusion in the revised document to be submitted to the next Committee meeting for its final approval. This document has been revised on the basis of comments received by the Secretariat by January 15, 2009.

4. The Secretariat was also requested to prepare a technical note regarding criteria to be applied in CTF financing for carbon capture and storage-ready coal power plants, fuel switching from coal to gas, and rehabilitation of coal-fired power plants. This technical note is presented separately as document CTF/TFC.2/4. The Committee is invited to approve the CTF Investment Criteria on the basis of its review of the technical criteria for CTF coal and gas investments.

## **Principles**

5. The proposed CTF investment criteria take into account the principles agreed by representatives of governments participating in the final design meeting on the Climate Investment Funds (Potsdam, May 2008), and approved by the World Bank’s Board at the time of its consideration and approval of the establishment of the CTF in July 2008. These principles are:

- (a) The core mission of the MDBs is sustainable economic growth and poverty reduction. Climate change mitigation and adaptation considerations need to be integrated into the sustainable development process as addressing these issues contributes to the basic human needs of the poorest who are disproportionately impacted by the negative effects of climate change;

- (b) Multilateral development banks can and should play a role in ensuring access of developing countries to adequate financial resources and appropriate technology for climate actions;
- (c) The MDBs should mobilize new and additional financing for adaptation and mitigation programs to address climate change that are country-led and designed to support sustainable development and poverty reduction. Activities financed by the fund should be based on a country-led approach and should be integrated into country-owned development strategies, consistent with the Paris Declaration;
- (d) Achieving sustainable outcomes will require sustaining the total wealth -- produced, human, institutional and natural -- on which development depends;
- (e) The UN is the appropriate body for broad policy setting on climate change, and the MDBs should not preempt the results of climate change negotiations. Actions to address climate change should be guided by the principles of the UNFCCC;
- (f) The MDBs, in collaboration with other development partners, should assist developing countries to build country-level knowledge, capacity and development project experience;
- (g) It is appropriate for the MDBs to build partnerships with each other and a wide range of institutions and stakeholders on climate change, including the private sector. In doing so, each MDB should remain accountable to its governing body;
- (h) Complementarities between activities foreseen for the CTF and activities of the GEF and the UN, especially at the country level, should be identified, and effective cooperation established, to maximize synergies and avoid overlap; and,
- (i) The CTF should provide for transparency and openness in its governance and financing operations.

### **CTF Investment Criteria**

6. Financing from the CTF will be provided on the basis of an investment plan, developed under the leadership of the recipient country in coordination with the MDBs, for the use of CTF resources in the country through a joint MDB program. The investment plan should highlight how it is embedded in national development plans or programs that include low carbon objectives. The investment plan will include a potential project pipeline and associated notional resource envelope. A group of countries may present a proposal for CTF co-financing through a joint investment plan.

7. The CTF will use the following criteria to assess and prioritize the proposed pipeline of programs and projects, with a view to maximizing the impact of CTF resources<sup>2</sup>:

- (a) Potential for GHG Emissions Savings
- (b) Cost-effectiveness
- (c) Demonstration Potential at Scale
- (d) Development Impact
- (e) Implementation Potential

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<sup>2</sup> The CTF will develop a common database where feasible to support the decision-making process using these investment criteria.

(f) Additional Costs and Risk Premium

8. The CTF will focus on high abatement opportunities at the country level (but could support sub-regional and regional initiatives<sup>3</sup>) and will be technology-neutral. There will be no *a priori* allocations to specific proven technologies or sectors. Financing from the CTF could cover, among other low carbon technologies, one or more of the following proposed transformational investments:

(a) Power Sector, resulting in substantial reductions in carbon intensity of electricity production (t CO<sub>2</sub> eq./MWh)<sup>4</sup>

- (i) Increase substantially the share of renewable energy (including but not limited to solar, wind, hydropower<sup>5</sup>, biomass and bio-fuels, geothermal, wave and tidal power, and sustainable waste-to-energy), in the total electricity supply;
- (ii) Switch to highly efficient gas plants resulting in significantly reduced carbon intensity of power generation and gas flaring;
- (iii) Achieve significant greenhouse gas reductions by adopting best available coal technologies with substantial improvements in energy efficiency (e.g. combined heat and power production) and readiness for implementation of new carbon reduction technologies, such as carbon capture and storage;
- (iv) Rehabilitation or retrofit of existing, inefficient thermal power plants with the objective of significant increases in efficiency.
- (v) Promote regional grid interconnection schemes that support lower carbon energy production;
- (vi) Significant reductions in transmission and distribution losses (new T&D systems using energy-efficient technologies, or retrofits/upgrades);
- (vii) Adopt utility managed demand management programs for retail and wholesale customers.

(b) Transportation, resulting in significant emissions reductions (CO<sub>2</sub> per passenger-kilometer or per ton-kilometer) through modal shifts, fuel efficiency or alternative fuel options:

- (i) Modal shift to low carbon public transportation in major metropolitan areas, with a substantial change in the number of passenger trips by public transport;
- (ii) Modal shift to low-carbon freight transport, with a substantial change in tonnage of freight moved by road transport to rail;

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<sup>3</sup> For sub-regional and regional investment plans, the unit of analysis would be the group of countries in the program.

<sup>4</sup> Criteria for CTF co-financing of low-carbon opportunities in coal and gas power investments are contained in document CTF/TFC.2/4.

<sup>5</sup> Hydropower qualifies for CTF if capacity is less than 10 MW per facility, which is the definition used for new renewable energy in the World Bank Group's Strategic Framework for Development and Climate Change.

- (iii) Improve fuel economy standards and fuel switching;
- (iv) Deployment of electric and hybrid (including plug-in) vehicles<sup>6</sup>.

(c) Large-scale adoption of renewable energy and energy efficient technologies that significantly lowers emissions and energy use per unit of output in buildings, industry and agriculture:

- (i) Low-energy buildings, solar heating, insulation, heat pumps, lighting and appliances;
- (ii) District heating and district cooling based on efficient or renewable heat or cooling production;
- (iii) Energy-intensive industries and equipment (e.g., motors, boilers, fans, drying, and pumping for irrigation and drainage).]

**Potential for GHG Emissions Savings**

9. Emissions Reduction Potential of Investment: The CTF’s objective is to invest in projects and programs with high GHG abatement opportunities at the country, regional or sub-regional levels. Each proposal for CTF funding will contain an assessment of direct CO<sub>2</sub>-equivalent emissions savings over the lifetime of the proposed program/project. Emission reductions will be calculated by subtracting projected lifetime emissions of the CTF-financed project from the projected lifetime emissions of the business as usual project that the country would have pursued without CTF financing. Higher priority will be given to investment proposals that have greater emissions reductions potential.

10. Technology Development Status: The CTF’s priority will be on the deployment, diffusion, and transfer of low carbon technologies that are at, or approaching, the “market take-off” phase and in sectors that make major contributions to GHG emissions. Proposals for CTF co-financing will be assessed on the basis of the technology’s stage of development and mitigation potential (t CO<sub>2</sub>-equivalent/year). Each project or program proposal will be classified in one of four categories:

Technically Viable – High Mitigation Potential	Commercially Available – High Mitigation Potential
Technically Viable – Low Mitigation Potential	Commercially Available – Low Mitigation Potential

- (a) **Technically Viable:** The basic science has been consistently proven and tested in the laboratory and/or on a limited deployment scale. However, as some technical and cost barriers remain, the technology has yet to be commercially demonstrated on a large scale.
- (b) **Commercially Available:** The technology is available from commercial vendors. Major technical issues have been resolved. Projected capital and O&M costs are well-understood. However, country specific barriers may

<sup>6</sup> Plug-in electric vehicles would be considered only when the energy systems from which they draw the power are less carbon intensive than the emissions from a stand-alone electric hybrid. The calculation of carbon emissions will be on a life cycle basis.

exist and/or the technology is not yet able to compete against more conventional options without some form of subsidy and/or internalization of emissions externality placed upon all energy options.

- (c) Mitigation Potential: High, if wide-spread replication of the technology across the sector will contribute to a significant proportion of emissions reduction at country level.

11. The CTF will not support technologies that are still in the research stage, but should be focused on deployment which may include commercial demonstration of new low-carbon technologies. Priority will be given to proposals for commercially available, significant mitigation potential technologies. Lower priority will be awarded to projects that are at the technically viable stage, but with low mitigation potential.

### **Cost-Effectiveness**

12. Each project/program proposal will include a calculation of the CTF investment per ton of CO<sub>2</sub>-equivalent reduced. In order to ensure the greatest impact of the CTF's limited resources, CTF co-financing will ordinarily not be available for investments in which the marginal cost of reducing a ton of CO<sub>2</sub>-equivalent exceeds US\$200, which according to the International Energy Agency's *Energy Technology Perspectives 2008* Report, is the lower-end estimate of the incentive needed to achieve the objectives of the "BLUE Map Scenario"<sup>7</sup>.

13. In addition to a cost-effectiveness calculation of the CTF co-financed investment, proposals will also require an analysis of the expected reduction in the cost of the technology due to technological progress and scale effect at a global level, and/or through organizational learning and scale effects at the country level. Technology learning curves, which show a constant reduction of the investment cost for each doubling of production, can be used to derive cumulative capacity needed for a technology to become competitive. While recognizing the limitations of learning curves, it is possible to quantify deployment costs of a new technology and assess cost-effectiveness relative to the emissions savings potential, for a given learning rate, initial cost of the technology, and cost of the competing incumbent technology.<sup>8</sup> Alternatively, new, innovative measurements of cost-effectiveness due to expected reductions at scale are also encouraged.

### **Demonstration potential at scale**

14. The goal of the CTF is to support transformational investments at scale, through thematic programs and large-scale projects, at the sector or sub-sector level in a given

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<sup>7</sup> IEA BLUE Map scenario explores a reduction of global GHG emissions to 50% of current levels by 2050. According to IEA, average costs are about one-fifth of marginal costs.

<sup>8</sup> IEA Energy Technology Perspectives Report's outlook for cost reductions provides a basis for such estimates.

country, sub-nationally, or regionally. In prioritizing investments, the CTF will assess the potential for significant reductions in GHG emissions growth as a result of the broader demonstration, deployment and transfer of low carbon technologies financed by the CTF.

15. Scope for avoided annual GHG emissions will be calculated on the basis of the potential emissions saving that would result if the CTF co-financed project were to be replicated throughout the targeted area, region, and/or sector of the country (or countries, for multi-country projects). This indicator will demonstrate both the potential for emissions reductions in absolute terms (i.e., CO<sub>2</sub>-equivalent avoided) and relative terms (i.e., as a percentage of total emissions).

16. Transformation Potential: Project/program proposals for CTF co-financing should demonstrate that they constitute a strategic effort to stimulate lasting changes in the structure or function of a sub-sector, sector or market. Such transformation should speed up or deepen market penetration of a low carbon technology relative to business as usual. Strong market transformation will result in economies of scale, enhanced competition and private sector participation, and eventually savings in the unit abatement costs. In the context of the CTF, the term “transformation potential” is defined as the extent to which the deployment, diffusion and transfer of technologies and the implementation of policy reforms result in significant reduction in emissions growth against a national, regional or sector baseline.

17. Each project/program proposal should include at least three GHG emissions trajectories for the sub-sector/sector that is proposed as a target for CTF co-financing<sup>9</sup>:

- (a) *Scenario 1* -- a baseline trajectory of GHG emissions for the targeted sector.
- (b) *Scenario 2* -- the trajectory of reduced emissions that would result directly from the CTF co-financed project alone.
- (c) *Scenario 3* -- the trajectory of reduced emissions that would result if the CTF co-financed project were to be replicated throughout the targeted area, region, and/or sector.

18. A project’s relative transformational potential can be measured by the ratio of emissions reduction potential between Scenario 3 and Scenario 2. A project with a larger ratio would have more transformational potential than one with a smaller ratio.<sup>10</sup>

## **Development Impact**

19. A key objective of the CTF is to demonstrate the potential for low-carbon technologies to contribute to sustainable development and the achievement of the Millennium Development Goals. The potential development impacts of projects and

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<sup>9</sup> Calculations of projected GHG emissions trajectories should include non-CO<sub>2</sub> GHG emissions, but should not include GHG emissions related to changes in forest cover or land use.

<sup>10</sup> The CTF will consider sector trajectories generated by the countries themselves. Additional resource material is available through the World Bank’s Development Prospects Group, which has an underlying data base (GTAP) with over 100 countries and 57 sectors.

programs will be assessed consistent with standard MDB appraisal criteria, with particular emphasis on the following three indicators.

20. Potential efficiency gains will be measured by the projected reductions in energy intensity of GDP (as well as of the relevant sector) as a result of the deployment and replication of the low carbon technology throughout the sector or sub-sector.

21. CTF programs/projects that help accelerate access to affordable, modern energy or transport services for the poorest would contribute significantly to the achievement of the MDGs. Investment proposals will be assessed and prioritized according to their potential to increase household electricity access rates, reduce energy supply costs, the extent to which transport services increase access to mobility for those most dependent on them, or increase reliability of power for business and industry.

22. Environmental co-benefits: Reducing emissions of air pollutants from energy-related activities, including electricity production and transportation, as well as reducing contaminant discharges in liquid effluents from energy systems, are important sustainable development objectives. CTF investments should address major impacts of pollutants on health and the environment, particularly fragile ecosystems.

### **Implementation Potential**

23. CTF investment proposals will be assessed on three dimensions that are closely related to successful implementation, consistent with standard MDB appraisal criteria.

24. Public policies and institutions should support deployment, diffusion and transfer of low carbon technologies, demonstrated through:

- (a) Country and sector strategies: Key policy, institutional and other issues relevant to achievement of sector objectives are addressed.
- (b) Institutional and implementation arrangements: Institutions responsible for implementation identified, with capacity to support technology adoption or capacity can be developed in the short term.
- (c) Sustainability: Evidence of commitment to and ownership of project and relevant policies, as well as arrangements for long terms operations and maintenance.

25. A key objective of the CTF is to mobilize resources at scale for the deployment, diffusion and transfer of low carbon technologies. Investment proposal will be prioritized on the basis of the co-financing leveraged from domestic public and private sector sources, including carbon finance, as well as bilateral and multilateral development partners.

### **Additional Costs and Risk Premium**

26. CTF financing will provide a grant element tailored to cover the identifiable additional cost of an investment, or the risk premium required, in order to make the investment viable. A project/program will be considered for CTF co-financing in any of



the following scenarios of financial viability based on rate of return without CTF concessional resources:

- (a) Negative rate of return
- (b) Rate of return below normal market threshold
- (c) Rate of return above normal market threshold, but below risk premium for project type, technology, sector or country
- (d) Rate of return above normal market threshold, but acceleration of low carbon investments has higher opportunity costs

27. Each project/program proposal should clearly identify the additional costs or risk premium that affect the rate of return of the investment on account of reduction of GHG emissions and outline how the grant element in the CTF financing covers such additional costs or risk premium. The proposal should also demonstrate how CTF co-financing could be used, possibly in combination with revenues from emissions reductions, to make low carbon investments financially attractive by improving the internal rates of return on such investments. This analysis should be embedded in the multilateral development banks' standard projection of financial internal rates of return in their project documents.

28. In particular, it is recognized that risks could drive the required rate of return of commercial finance higher than that required for more familiar project investments. Therefore, concessional funding may be necessary to raise a "risky" project to a high enough rate of return to make it viable. Similarly, accelerating the deployment of low carbon technologies might require financial incentives, given competing budget demands on national/local authorities and the climate change mitigation benefits of earlier action.

29. It is proposed that the CTF should aim to go beyond the scope of the CDM, whilst remaining open to co-supporting eligible projects and technologies. In practice this means that the CTF would not fund projects that would be routinely financed by CDM. Rather the CTF could fund technologies that CDM is failing to deploy at scale or where CDM is unable to provide support – such as financing long distance transmission and many cases of buildings or transport energy efficiency. The key decision criterion is whether carbon finance is an insufficient incentive to deploy the low carbon technology at scale in the recipient country.

30. CTF financing should also complement the GEF through scaled-up deployment, diffusion and transfer of technologies to prove they can work on a commercial scale and/or to reduce costs through learning by doing. GEF's mandate in the climate change mitigation area provides financing: (a) to pilot and demonstration innovative technologies; (b) to remove barriers to transform markets, and (c) for capacity building, in particular creation of an enabling environment, including establishment of codes, norms and standards.