

## Supplemental Appendix: Use of CTF Resources to Support Philippines EEV's Project

### A. Background

1. The 2005 Gleneagles G-8 Summit in July 2005 stimulated a concerted effort by the development community to broaden and accelerate support to developing countries relating to energy access and climate change through the Clean Energy Investment Framework (CEIF).<sup>1</sup> The CEIF provides the basis for definition of a range of possible initiatives to be developed within each multilateral development bank (MDB). Pursuant to the CEIF, in 2008 the donor community committed approximately \$6.1 billion to the new Climate Investment Funds (CIFs) to be invested through the MDBs.<sup>2</sup> About \$5.2 billion equivalent was pledged to the Clean Technology Fund (CTF) for climate change mitigation in developing countries.<sup>3</sup> ADB's Board of Directors approved the use of CTF resources on 5 November 2009.<sup>4</sup> The partnership agreement was approved on 18 March 2010.

2. The joint MDB mission for Philippines was conducted in July 2009; the CTF Country Investment Plan (CIP) was endorsed in December 2009. The CIP was revised in 2011 and 2012 to include the proposed EEV's project; the revised CIP was requested to be endorsed by the CTF Trust Fund Committee in June 2012.<sup>5</sup> Project and loan documentation includes a separate cofinancing agreement for the CTF funds, similar to that for other official cofinancing.<sup>6</sup>

3. The design of the CTF acknowledges some of the operational problems and limitations of the Clean Development Mechanism (CDM) and the Global Environment Facility (GEF), and it specifically seeks to leverage donor financing with commercial bank financing and private sector-led investments.<sup>7</sup> CTF generally targets energy efficiency (EE), renewable energy (RE), and cleaner transport opportunities, and includes consideration for non-climate benefits and development impacts. CTF is "technology-agnostic." Newly commercialized technologies may be supported, but CTF is not intended to be a substitute for venture capital to support new technology development.

4. The CTF principles and objectives are fully consistent with the *ADB Strategy 2020* emphasis on inclusive and environmentally sustainable growth; private sector development and operations; and investment focus on infrastructure, environment (including climate change), and financial sector development. CTF is also fully consistent with the *ADB Energy Policy 2009* focus on clean energy development, in particular the emphasis on energy efficiency and

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<sup>1</sup> ADB's Energy Efficiency Initiative was launched at approximately the same time.

<sup>2</sup> The participating MDBs are the World Bank Group (including its private sector window the International Finance Corporation [IFC]), the African Development Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, and the Inter-American Development Bank. World Bank is the trustee of the CIFs.

<sup>3</sup> Details can be found at [www.worldbank.org/cifs](http://www.worldbank.org/cifs)

<sup>4</sup> ADB Board Paper R215-09, November 2009.

<sup>5</sup> The revised CIP and the proposed EEV's project were submitted to the Trust Fund Committee for consideration at the same time.

<sup>6</sup> The detailed mechanics of funds transfer are covered in the "Financial Procedures Agreement between Asian Development Bank and the International Bank for Reconstruction and Development as Trustee of the Trust Fund for the Clean Technology Fund," dated 18 March 2010.

<sup>7</sup> CDM has been somewhat successful for industrial energy efficiency projects, but has a very poor record of utility grid improvement and demand-side management projects; collectively, these categories comprise less than 10% of registered projects. As of 18 October 2011, only 9 transport sector projects have been registered out of 3,534 projects, representing 0.22% of total projects. Energy supply projects, including RE, comprise just over 67% of total registered projects. Project information accessed on 18 October 2011 at: <http://cdm.unfccc.int/Statistics/Registration/RegisteredProjByScopePieChart.html>

renewable energy; access to energy for all; and energy sector reforms, capacity building, and governance.

## B. Project Eligibility

5. The Philippines CIP will cofinance renewable energy (RE), energy efficiency (EE), and cleaner transport investments in both the public and private sector. The Investment Plan has been updated at the request of the Government of the Philippines (GoP); the revised financing plan is summarized in Table SA31.1. The proposed project to support energy efficient electric vehicle (EEVs) deployment is fully consistent with the context and objectives of the CIP.

**Table SA31.1: Philippines Revised CTF Financing Plan 2012(\$million)**

Financing Source	Renewable Energy (WBG)	Urban Transport (WBG)	Energy Efficient Electric Vehicles (ADB)	Solar Energy Development (ADB)	Total
CTF	75	50	105 <sup>a</sup>	20 <sup>a</sup>	250
GoP / DBP	180	50	99	20	349
IBRD Loans	250	180	0	0	430
IFC Loans	250	0	0	0	250
ADB Loans	0	0	300	80	380
Private sector	750	0	(tbd) <sup>b</sup>	(tbd) <sup>b</sup>	750
Other cofinancing	0	20	0	0	20
<b>Total</b>	<b>1,505</b>	<b>300</b>	<b>504</b>	<b>120</b>	<b>2,429</b>

Source: MDB teams

ADB=Asian Development Bank, CTF=Clean Technology Fund, DBP=Development Bank of the Philippines, EE=energy efficiency, GoP=Government of the Philippines, IBRD=International Bank for Reconstruction and Development, IFC=International Finance Corporation, RE=renewable energy, (tbd)=to be determined, WBG=World Bank Group

Notes:

<sup>a</sup> For the EEVs project, a CTF grant of \$1 million is requested for fine-tuning of technology options, technology transfer, local industry support and capacity building (implementation support, including monitoring and evaluation activities will be financed by the ADB loan). For the Solar Charging Systems component a CTF grant of \$4 million is requested to ensure its technical viability and whether solar charging could be implemented within the current tariff of about \$0.20/kWh; see discussion in main text and concept paper in Appendix 2 for further details.

<sup>b</sup> Private sector entities will participate in project implementation via supply of goods and services. For the EEVs project, private sector investment is expected during replication and scale-up, and as such no private sector cofinancing is shown. Private sector cofinancing for the Solar Energy Development project has yet to be determined.

6. The proposed project meets the CTF eligibility criteria, as discussed below and as summarized in Table SA31.2.<sup>8</sup>

<sup>8</sup> Further discussion is included in the revised CIP.

7. The proposed Project is consistent with the scope of transport sector intervention outlined in the CIP, bringing additional value by opening a new “window” for deploying sustainable transport systems beyond bus rapid transit lines. More efficient battery technologies are providing a cleaner alternative to pollution-emitting internal combustion engines. In many cases, conventional motorcycles emit more pollution than large SUVs because they are not equipped with equivalent emissions-control technology.<sup>9</sup> Electric motorcycles and tricycles can immediately eliminate tailpipe emissions, significantly reducing urban air pollution. Commercial success of EEEVs can be replicated in other types of vehicles, including jeepneys and buses.

8. The EEEVs Project will result in avoided fossil fuel emissions of about 0.27 million tCO<sub>2e</sub>/y. With a minimum vehicle lifetime of 10 years, the project will generate 2.7 million tCO<sub>2e</sub> total reductions. Cost-effectiveness is estimated as: CTF\$105 million / 2.7 million tCO<sub>2e</sub> = CTF\$ 38/ tCO<sub>2e</sub>, declining to CTF\$3.89/ tCO<sub>2e</sub> with replication and scale-up. The EEEVs project will bring environmental and public health co-benefits equal to or greater than that which would be realized under the original CIP. The non-climate benefits are much greater than what could be achieved through other RE and EE investments.

9. Commercial deployment of EEEVs will expand the urban transport program beyond the original CIP. The replication potential for EEEVs is at least 10 to 1, and is expected to be as high as 20 to 1. CTF cofinancing on this type of pioneer project will eliminate first-mover risk and will help mobilize future commercial investment for replication and scale up.

**Table SA31.2: Summary Assessment of CTF Eligibility**

<b>CTF Investment Criteria</b>	<b>Proposed EEEVs Project Eligibility</b>
<b>Potential for GHG Emissions Savings</b>	ADB program will target end-use efficiency improvements which represent permanent energy savings via vehicle fleet conversion and avoided fuel imports. Replication and scale-up potential is high for electric vehicles.
<b>Cost-effectiveness</b>	100,000 vehicles will deliver net reduction of 270,000 tCO <sub>2e</sub> per year; with 10-year vehicle lifetime total GHG reductions are 2.7 MtCO <sub>2e</sub> . Replication and scale-up potential is at least 10 to 1 and may be as high as 20 to 1.  <u>Cost effectiveness:</u> CTF\$105 million / 2.7 million tCO <sub>2e</sub> = CTF\$38 / tCO <sub>2e</sub> , declining to CTF\$3.89 / tCO <sub>2e</sub> with replication and scale-up of 10 to 1.
<b>Demonstration Potential at Scale</b>	Transformation potential is estimated to be more than 20 for EEEVs (e-trikes) <sup>a</sup>
<b>Development Impact</b>	The EEEVs project will accelerate growth of the electric vehicle industry in the Philippines by demonstrating new technology / systems and business models.  Impacts with respect to energy security and environmental benefits are consistent with the CIP. Impacts on employment are significant given the potential benefits accruing to e-trike owner/operators.
<b>Implementation Potential</b>	The EEEVs project has been developed based on a successful pilot project in the Metro Manila region and is at an advanced stage of preparedness. See Table 8 of revised CIP for discussion of implementation risks and mitigation.
<b>Additional Costs and Risk Premium</b>	The proposed project will focus on using CTF for covering additional costs associated with introduction of electric vehicle systems and related new business model for vehicle ownership and operations.

<sup>a</sup> Transformation potential is defined in paragraphs 15 - 17 of the *CTF Investment Criteria for Public Sector Operations* dated 9 February 2009.

<sup>9</sup> The Technology Review, published by MIT, 2007, available at: <http://www.technologyreview.com/energy/19069/>

10. New investment in electric vehicles will improve energy security, reduce GHG emissions, and reduce conventional pollutant emissions with substantial public health benefits. CTF cofinancing for this type of pioneering project will help mobilize future commercial investments for replication and scale up, which will stimulate economic growth and facilitate the long-term transition to low-carbon development.

11. The EEEVs Project is scheduled for presentation to ADB's Board of Directors in August 2012. The Project enjoys broad stakeholder support due to the success of the pilot project, including consumers, vehicle owners and operators, local, and national government. The President of the Philippines has enthusiastically supported project development and requested that ADB expedite process and approvals. Risks and mitigation measures are outlined in the main text of the RRP as well as in the in revised CIP.

12. Additional costs and risk premiums justify use of CTF. The EEEVs Project is first-of-a-kind in the Philippines, and will be the largest effort in the Asia region to begin electrification of the public vehicle fleet. The cost of new EEEVs with lithium-ion batteries is about \$4500, versus about \$2000 for conventional trikes with internal combustion engines. This up-front capital cost is offset by lifecycle operating costs of about \$2000 for 200,000 kilometers, versus about \$10,000 for conventional trikes. The Project presents first-mover risk (mitigated in part by the successful pilot project), and presents higher-than-normal end-user costs with respect to purchase of new vehicles. Although lower operating costs will offset the initial purchase costs, at present there is no mechanism to monetize the life-cycle savings to assist end-users in the initial purchase.

13. Carbon finance is increasingly at risk due to post-2012 market uncertainties. Carbon finance opportunities will be pursued but any revenue is expected to be "on delivery" and will not be sufficient to catalyze up-front investment. ADB expects that the project could qualify for Clean Development Mechanism (CDM) registration, but any carbon revenue would be "on delivery" and would not make a contribution as up-front cofinancing. Potential revenue from sale of emissions reductions is uncertain until registration with the UN, which typically occurs after the project's financial close.

14. Additional discussion about CTF eligibility has been presented in the revised CIP and for brevity's sake is not repeated here. A third party technical review, required by CTF procedures, concluded that the Project meets the CTF eligibility requirements.

### **C. Pricing and Loan Terms of CTF projects**

15. As noted above, at the project or investment program level, the CTF is used to cover the additional costs and/or risks associated with low-carbon investments. For example, fleet-wide conversion to electric vehicles presents an upfront cost barrier in the form of new vehicle procurement. The additional cost can be readily estimated as the difference between capital costs for traditional trikes with internal combustion engine versus the new EEEVs equipped with lithium-ion batteries.<sup>10</sup> The additional risk is presented by introducing a new business model for vehicle ownership and operations, including battery leasing, for the new EEEVs.

16. The loan terms for CTF financing are presented in Table SA31.3. These are the "base" terms for public sector projects. The harder pricing terms and conditions are requested for the proposed EEEVs Project.

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<sup>10</sup> The new EEEVs are estimated to cost \$4500 per vehicle.

**Table SA31.3: Proposed CTF Loan Terms**

CTF Loans	Maturity	Grace Period	Principal Repayments Year 11-20	Principal Repayments Years 20-40	FY09-10 MDB Fee <sup>b/</sup>	FY09-10 Interest Rate <sup>c/</sup>	Grant Element <sup>d/</sup>
Harder Concessional	20	10	10%	N/A	0.18%	0.75%	~45%
Softer Concessional	40	10	2%	4%	0.18%	0.25%	~72%

Source: Climate Investment Funds. *Clean Technology Fund Financing Products, Terms, And Review Procedures For Public Sector Operations*, (Revised Document) 15 December 2011.

Notes:

a - CTF Loans May Include An Acceleration Clause, Providing For Doubling Of Principal Payments.

b - The MDB fee will be a variable charge set annually within a range of 0.1%-0.5% of the undisbursed balance of the loan, to be retained by the MDB.

c - The interest is charged on the disbursed and outstanding loan balance. Principal and interest payments accrue semi-annually to the CTF trust fund.

d - Grant element is calculated using the IDA methodology (assumptions: 6.33% discount rate for harder loans; 6.43% discount rate for softer loans; semi-annual repayments; 8-year disbursement period)