Philippines CTF Update – Comments Matrix (December 2011)

Question / comment	Response
1. CTF cost-effectiveness and eligibility	The proposed changes will result in projects which are more cost-effective than the original net metering program. See calculations in Tables 5, 9, and 10 and discussion at paragraphs 38, 49, and 50. CTF eligibility is placed in context in Section III (paragraphs 17-32 and Figures 1-5). Detailed discussion of eligibility is delineated in Table 5 and paragraphs 36-44, which clearly indicate that the proposed changes will enhance the CTF Investment Plan. CTF guidelines note that cost effectiveness is cost per ton CO_2 equivalent avoided over the lifetime of the project, not cost per ton per year. This guidance has been followed by other CTF investment plans and projects, although there is not 100% consistency. i.e., some investment plans have presented cost effectiveness on $/ton/year basis; some have shown cost/ton over project lifetime; and some have not shown any explicit calculation of cost-effectiveness (e.g., India). The cost effectiveness of the Energy Efficient Electric Vehicles (EEEVs) and EE appliances projects is better than the originally-proposed solar net metering project and compares favorably to other proposed CTF projects (see table at end of this document).
2. What other options have been considered as alternatives to electric vehicles (e.g., CNG, LPG)?	All options have been and continue to be considered; see discussion at paragraph 51. CNG and LPG must be imported; switching from gasoline to these fuels results in minimal GHG reductions and does not enhance energy security. Switching from diesel to CNG may achieve 20% GHG reduction in best case scenario, but the energy efficiency gain would still be lower than that achieved via EEEVs. CNG and LPG may be practical for cars, light trucks, and heavy-duty vehicles, but these fuels do not present an opportunity for conversion of motorcycles and trikes, which are at the bottom of the public transport pyramid. See discussion at paragraphs 26-32 and 51. The originally proposed BRT investments led by World Bank Group are still being pursued.
3. What is the role of private sector [in the EEEVs project], which was noted in the original CIP?	The private sector is actively engaged in RE development, as discussed at paragraphs 17 and 18. Electricity generation in the Philippines is now 100% private sector. As discussed in paragraphs 17-19, concessional finance is not obviously needed for the net metering program. Public sector financing for RE projects in the near-term would crowd out private sector investment, which would be contrary to GoP overall objectives for the power sector. Private sector entities have not developed any credible investment projects for EEEVs or more efficient appliances, and GoP is therefore taking the lead in affecting change. Private sector entities will be engaged in implementation via service, supply, and maintenance contracts, and will be expected to lead replication and scale up via vehicle production, distribution, and operations and maintenance (see paragraph 39). However; total private sector investment has yet to be quantified and therefore is not shown in Table 4. Introduction of EEEVs presents classic first-mover risk: globally, new vehicle technologies and systems are being developed, but "technology push" is not sufficient to begin fleet-wide fleet conversion. "Policy pull" is required and GoP is developing an electric vehicle policy, as noted in Appendix 1, paragraph 6.
4. Grid connection: is there sufficient generation capacity? I.e., will more end-users overstress the grid? How will electric vehicles impact generation mix?	The proposed EEEVs project is expected to add 60 MW of incremental demand to the grid, which will be offset by 110 MW in savings from the EE appliances project and 138.5 MW in new RE generation capacity. Incremental demand of 60 MW is 0.37% of installed generation capacity; annual incremental energy consumption of 150 GWh is 0.22% of generation output in 2010 (see Appendix 1, Table A1.3). See discussion at paragraph 45, Table 8, and Appendix 1. Grid expansion scenarios with respect to GHG implications are presented in Appendix 1. Table 8 shows that the EEEVs project would not have a negative impact on grid-supplied power at the retail consumer level. Considering that an additional 1200 MW of coal-fired

	capacity is being developed (see Appendix 1, Table A1.2), grid-supplied electricity would not be "stressed" until replication and scale-up of 20:1 is achieved, i.e., deployment of 2 million e-trikes. Calculations presented in Appendix 1 indicate that GHG reductions will still be achieved if the grid-supplied power is 100% coal-fired: Appendix 1 shows clearly that ICE engines running on gasoline with 25% thermodynamic efficiency are more carbon-intensive than e-trikes powered with 100% coal-fired electricity. Clean energy accounts for about 66% of power generation and about 39% of total primary energy as shown in Figure 6. Figure 6 indicates that oil dominates the transport sector, presenting a tremendous opportunity for end-use efficiency gains via electric vehicles. Additional RE capacity is being developed in line with Philippines Energy Road Map, including the IBRD and IFC programs supported by CTF.
5. How to dispose of lithium ion batteries?	Li-ion batteries are classified as non-hazardous waste by US EPA and Philippines Department of Environment and Natural Resources. Batteries will be reused to the maximum extent possible and can be disposed to sanitary landfills at end of useful lifetime. See discussion at paragraph 48 and footnotes 20-22.
6. Explain further energy efficiency is a case of market failure. For energy efficiency, what will be underlying transformation? What about other options, e.g., standards and labeling?	The energy and electricity markets and regulatory framework are discussed extensively in the original CIP and for the sake of brevity these details are not repeated in the draft IP Update. Clearly, with retail electricity prices averaging around $0.20 per kWh – the highest in the region – private sector investors and commercial banks should be racing each other to implement RE and EE projects. Since this is not happening there is an obvious market failure, which is not uncommon globally: standards and labeling are not sufficient to change consumer behavior. See discussion in paragraph 52 and Appendix 2. As noted in the original CIP, Table 4, the Philippines has yet to approve an energy conservation law (as has been done in other Asian countries), which limits application of policy instruments to address market limitations. In the absence of a comprehensive energy conservation law, CTF is an attractive prospect to catalyze innovative EE investments.
7. For the EEEVs project, what are additional costs and what is expected operating lifetime of the e-trikes? Have "learned rates" been considered in the context of replication and scale up.	The additional cost of an e-trike vs. conventional trike is at least $1000 (see paragraph 43, and Appendix 1 paragraph 3). Operating lifetime is assumed to be 10 years as noted in paragraph 50 and Table 5. At present there is no mechanism to monetize the life-cycle fuel savings and bring those benefits as up-front project cofinancing. The pilot project conducted in Mandaluyong City has provided valuable experience, and the proposed EEEVs project has been designed based on that learning curve. Replication and scale-up potential is more than 20:1 nationwide, but the GHG reduction and cost-effectiveness estimates assume 10:1 replication and scale-up. Additional "learning rates" would result in replication and scale-up greater than 10:1.
8. What is the proposed transformational delivery mechanism for EE appliances?	The EE appliances project is at an early definitional stage. Preliminary market analysis is discussed in Appendix 2. GoP and ADB are considering different options for delivery mechanism based on the experience of converting from conventional incandescent lighting to CFLs (gained through the Philippines Energy Efficiency Project). Additional details will be presented in the draft Board documents when the project reaches the appraisal stage (after the IP Update is endorsed).
9. For EEEVs, are the GHG reductions calculated on life-cycle basis? Need to show that CTF conditions for Plug-in vehicles are	GHG reductions are based on a life-cycle basis ("well to wheels"). Estimates are consistent with that for electric vehicles in other countries. See discussion in paragraph 47 and Appendix 1. Grid expansion scenarios with respect to GHG implications are presented in Appendix 1. Net GHG reductions would be realized even if the grid was providing 100% coal-fired

met.	power. Appendix 1, Table A1.1 presents the GHG reduction estimates prepared by ADB's carbon finance team in anticipation of Clean Development Mechanism registration. These estimates are consistent with calculations made independently by the ADB project team. ADB and GoP believe that the GHG reduction estimates presented are conservative and robust.
10. For the EEEVs project, "rebound effects" should be considered.	CTF guidance does not require consideration of rebound effects. Rebound effects have not been mentioned in any other CTF Investment Plans and no questions have been raised about rebound effects in review of IPs and specific project proposals. A recent report prepared by the European Commission discusses various studies on rebound effects in considerable detail (Maxwell, D., Owen, P., McAndrew. L, Muehmel, K., Neubauer, A., *Addressing the Rebound Effect*, a report for the European Commission DG Environment, 26 April 2011). The report by Maxwell *et al* covers various sectors including energy and transport, and notes that the rebound effects are real but are difficult to quantify [which is consistent with the fact that CTF guidance does not require consideration of rebound effects]. Section 4.1, page 30 of Maxwell et al notes: *Generally, rebound effects are difficult to quantify and their significance in different circumstances is debated. For example, some of the theories controversially claim that the rebound effect can be responsible for up to 50% of increased consumption, while in others, that rebound can negate the environmental gains 100% - a so called "backfire" (Jevons, 1865; Khazzoom, 1980; Brookes,1990 and 2000). In practice, the magnitude of the rebound effect is dependent on individual circumstances e.g. sectors, technologies and income and is linked with a range of factors impacting consumption and economic growth. Understanding these factors and their role in direct, indirect and economy wide rebound effect is key to understanding the significance of the rebound effect associated with different interventions.* Clearly, this indicates that a comparison such as improved fuel efficiency in heavy duty trucks in the EU zone versus the proposed EEEVs in the Philippines would be a case of "apples and oranges." In the report by Matthews *et al*, the only study referenced for hybrid and electric vehicles covers hybrid vehicles in Switzerland. The Switzerland study concluded that there were no rebound effects (direct or indirect) associated with introduction of the more energy efficient vehicles (see Matthews *et al*, Table 1.2., page 20 and Case Example on page 76). Given the complexity of quantifying potential rebound effects, such consideration is not required by guidance of CTF, ADB, other MDBs, nor Clean Development Mechanism. As suggested by the UK, Table 9 includes a scenario discounting GHG reductions by 30% for potential rebound effects. This scenario will result in greater emissions reductions, which are more cost-effective, than the originally proposed net metering project. The calculations in Table 9 are consistent with GHG reduction estimates presented in Tables 5 and 10, and Appendix 1.
11. Why is DOE the executing agency for the EEEVs projects rather than the DOTC?	DOE is the designated agency for EE activities as well as alternative fuels including electric vehicles (see paragraph 42).
12. EEEVs fuel consumption is noted as 5 L/day in main text but 20 L/day in appendix.	The correct amount is 5 L/day; this has been corrected. Other errors and inconsistencies have been corrected.

Cost-effectiveness: Comparison of Various CTF Proposals

Program / Project	CTF Amount ($ million)	Cost-effectiveness of Direct Reductions	Cost-effectiveness with Replication and Scale-up
Egypt Urban Transport	$100	$66.67 / ton / year	$3.3 / ton
Morocco Wind & Pumped Storage [a]	$125	$73.53 / ton / year	$3.7 / ton
Philippines: IFC Renewable Energy Accelerator Program	19	$6.67 / ton	$1.33 / ton
Vietnam: IFC Energy Efficiency Program	28	$59 / ton / year	$4.2 – 6.5 / ton (15-year program lifetime)
Republic of South Africa (RSA): AfDB and IFC Energy Efficiency Program	$15	$5.56 / ton	$4.55 / ton
RSA Solar Water Heating Program	$50	$20 / ton	$4.35 / ton
RSA Sustainable Energy Accelerator Program (solar, wind, & cogeneration)	$83	$3.22 / ton	$0.65 / ton
Thailand: IFC Sustainable Energy Finance Program	$30	$4.44 / ton	n/a
Thailand: IFC Renewable Energy Accelerator Program	$40	$16.67 / ton	$1.67 / ton
Philippines: ADB EEEVs project (proposed)	$101	$37.41 / ton	$3.74 / ton

Source: project funding proposals approved by CTF Trust Fund Committee (except for Philippines EEEVs project)
Note: [a] Emissions reductions are for the entire program of 450 MW wind power + 520 MW hydro-pumped storage, with total investment of about $2.1 Billion.