

**Approval Request for Expansion of the Approved CTF Program (Philippines, IFC, REAP)<sup>1</sup>**

<b>1. Country/Region</b>	<i>Philippines</i>							
<b>2. Project/Program Title</b>	<b>Expansion of the Approved Philippines <i>Renewable Energy Accelerator Program (REAP)</i></b>							
<b>3. Terms and Amount Requested in million USD equivalent</b>	<b>Public sector – <i>n/a</i></b>							
	<p><b>Private sector</b></p> <p><b>New funding request: Investment – up to US\$6.1 million</b></p> <p>This new request will be added to the already approved Philippines <i>REAP</i><sup>2</sup> allocation of US\$20 million, making the total funds available for <i>REAP</i>:</p> <table border="0"> <tr> <td>Investment</td> <td>US\$25.1 million</td> </tr> <tr> <td>Advisory services grant</td> <td>US\$0.5 million</td> </tr> <tr> <td>Implementation &amp; supervision budget</td> <td>US\$0.5 million</td> </tr> <tr> <td>Total allocation for <i>expanded REAP</i></td> <td>US\$26.1 million</td> </tr> </table> <p>The new funds for <i>REAP</i> (US\$6.1 million) will be made available by releasing US\$6.1 million from the US\$10 million allocation to IFC's Philippines <i>Sustainable Energy Finance Program (PSEFP)</i>, approved by the TFC in February 2011.</p>	Investment	US\$25.1 million	Advisory services grant	US\$0.5 million	Implementation & supervision budget	US\$0.5 million	Total allocation for <i>expanded REAP</i>
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Advisory services grant	US\$0.5 million							
Implementation & supervision budget	US\$0.5 million							
Total allocation for <i>expanded REAP</i>	US\$26.1 million							
<b>4. Implementing MDB(s)</b>	<i>International Finance Corporation (IFC)</i>							
<b>5. National Implementing Agency</b>	<i>Private Sector</i>							
<b>6. MDB Focal Point</b>	<i>Joyita Mukherjee, CIF coordinator (<a href="mailto:jmukherjee1@ifc.org">jmukherjee1@ifc.org</a>)</i> <i>Andrey Shlyakhtenko, CTF focal point (<a href="mailto:ashlyakhtenko@ifc.org">ashlyakhtenko@ifc.org</a>)</i>							
<b>7. Brief Description of Project/Program (including objectives and expected outcomes)</b>								

**IFC allocations under the CTF Philippines Country Investment Plan**

The Philippines' Country Investment Plan (CIP, endorsed in December 2009 and revised in August 2012) identified the development of renewable energy (RE) resources as one of the key strategic areas for the application of CTF resources, including through private sector initiatives. As part of the support for these private sector initiatives, the CIP allocated US\$30 million to IFC. Following the initial market assessment and series of discussions with project developers, financial institutions and other stakeholders, the US\$30 million CTF allocation was distributed between US\$20 million for *REAP* and US\$10 million for *PSEFP*. *REAP* targets advancing of direct private sector investment in RE projects, while *PSEFP* aims at increasing the flow of capital to sustainable energy projects from financial institutions.

<sup>1</sup> This document requests an allocation of the additional funding to the Philippines *Renewable Energy Accelerator Program (REAP)*. Original *REAP* proposal (already approved by the TFC) is provided in Attachment 1.

<sup>2</sup> *REAP* was approved by the CTF Trust Fund Committee on September 14, 2010 (project ID# PCTFPH064A)

## Status of the *original REAP*

Since the program approvals, IFC has been actively engaged with private sector project developers and financiers in various RE sectors with the objective of identifying the most advanced and suitable sub-projects to merit CTF support. To date, however, there have been very few (private sector) RE projects in the Philippines. The uncertain fiscal and macroeconomic environment and commercially untested Feed-in-Tariff (FiT) regime pose substantial operational risks and challenges for first-mover projects in the RE sector and generally project developers have only moved forward with smaller-scale projects. As a result, many potential projects have not materialized and the CTF funds under *REAP* have not been committed to sub-projects yet.

## Current IFC RE pipeline

In the aftermath of typhoon Haiyan, which damaged a 650 MW geothermal plant supplying more than 10% of the country's electricity needs, the need for additional power capacity in the Philippines has become acute. In response to this need, IFC has developed a "bundled" pipeline of solar PV projects and biomass projects totaling roughly 150 MW. The bundled pipeline enables the project developer to benefit from economies of scale and scope, while partially reducing technology risk by pooling several projects of different RE technologies together. This pipeline of projects, however, requires a slightly higher level of CTF resources than currently available to IFC under the approved Program (*REAP*). Hence, IFC is seeking to expand the funds available to *REAP* by US\$6.1 million to be able to move this pipeline forward.<sup>3</sup>

The projects under this pipeline will be among the first utility-scale solar PV projects in the Philippines and, likely, the first biomass projects in the world using sugarcane trash as primary fuel.<sup>4</sup> Additionally, these projects will benefit from the co-location synergies. Specifically, the biomass sites are, coincidentally, ideal for solar PV projects: the climatic conditions and terrain characteristics for growing sugarcane happen to be also suitable for solar PV - relatively high annual irradiance, flat terrains, and minimal shading obstructions such as surrounding trees and buildings. The co-location of the biomass and solar PV projects is also likely to help gain greater community support – the solar PV projects, with much shorter construction periods, are able to gain confidence of the local communities, while the biomass projects, providing base-load and supplemental income to the local farmers, will be implemented over longer periods of time.

Once operational, this pipeline of innovative projects will create significant development impact by demonstrating the viability of the new FiT regime and attract investors and financiers to the country and the sector. If successful, the projects are expected to help catalyze future RE investments in the Philippines for solar PV and on a global basis for cane trash-based biomass projects.

Further, the current pipeline is aligned with the FY2015-2018 World Bank Group's Country Assistance Strategy for the Philippines. The projects will allow IFC to play a catalytic role in supporting the Government's efforts to transform the electricity sector in the Philippines by increasing the share of RE in country's energy mix. IFC and CTF will be supporting the first RE projects to be implemented under the 2008 Renewable Energy Act.

<sup>3</sup> Under the other IFC Philippines CTF program – *PSEFP* – IFC has fully implemented an advisory component and continues working on identifying pipeline of investment sub-projects. At this time, however, IFC does not foresee the need for the entire investment amount under the *PSEFP*.

<sup>4</sup> Cane trash has no other economic use and is typically burnt as agricultural trash in the field by farmers, despite a law prescribing to dispose of it.

## Scope, objectives, and terms of the expanded REAP

The scope, objectives and terms of the expanded *REAP* remain unchanged and match the ones stated in the original *Renewable Energy Acceleration Program* (see Attachment 1, sections Proposal Context, Barriers to Private Sector Investment, Program Summary). While the mix of RE technology is slightly different (IFC does not foresee any wind projects at this time), the overall objectives of the *Program* and magnitude of the impact remain the same.

## Expected impact of the expanded REAP

The outcomes and impacts of the *expanded REAP* are expected to be of the same nature as of the *original Program*, although of a higher magnitude as indicated in section 12 below.

The *expanded Program* will help establish a track record of RE projects and build confidence in the market for other projects to follow. *Expanded REAP* will provide a transformational role in the Philippine power sector by supporting early private sector participation in some of the first utility-scale projects that offer the potential to contribute in gigawatt scale to the country's energy mix. The demonstration effect of the proposed projects under the *expanded REAP* will include: i) paving the way for developers, investors and lenders to follow with scaled up investment; ii) demonstration of initial private sector utility-scale projects in several technology areas, which will improve capacity and breadth in the sectors providing these technologies (equipment supply, engineering, advisors etc.) and prove the technical and economic realities of these technologies in the Philippine context.

## 8. Consistency with CTF Investment Criteria

### For Private Sector Projects/Programs:

**(1) Potential GHG Emissions Savings**

230,000 MtCO<sub>2</sub>e per annum (p.a.);  
3,450,000 MtCO<sub>2</sub>e over the life of the loan (15 years)

**(2) Cost-effectiveness**

For the CTF funds: US\$7.3/MtCO<sub>2</sub>e  
For the total project funding: US\$136/MtCO<sub>2</sub>e

**(3) Demonstration Potential at Scale**

Please refer to the *Demonstration Potential at Scale* section of the *original REAP* proposal (Attachment 1).

**(4) Development Impact**

Please refer to the *Development Impact / Co-benefits* section of the *original REAP* proposal (Attachment 1).

In addition to the impacts indicated in the *original REAP* proposal, the *expanded REAP* will seek to deliver the following:

- Continuing Support to Sector Reform: The *expanded Program* will provide a sizable funding to a series of RE projects at the onset of the FiT introduction, setting the stage for the expediting the country's renewable shift. The success of the *expanded Program* will further endorse the country's power sector reform, which is the most comprehensive in the region and among the key reasons for the country's economic turn-around;
- Demonstration Effects: success of the *expanded Program* will demonstrate that these technologies – solar and biomass based on sugarcane trash – are replicable and can be

scaled up. As mentioned earlier, this *expanded Program* seeks to pioneer the use of sugarcane trash as primary fuel for biomass power plants.

**(5) Implementation Potential**

Please refer to the *Implementation Potential* section of the *original REAP* proposal (Attachment 1).

**(6) Additional Costs and Risk Premium**

Please refer to the *Additional Costs & Risk Premium* section of the *original REAP* proposal (Attachment 1).

**(7) Financial Sustainability**

Please refer to the *Financial Sustainability* section of the *original REAP* proposal (Attachment 1).

**(8) Effective Utilization of Concessional Finance**

Please refer to the *Effective Utilization of Concessional Finance* section of the *original REAP* proposal (Attachment 1).

**(9) Mitigation of Market Distortions**

Please refer to the *Mitigation of Market Distortions* section of the *original REAP* proposal (Attachment 1).

**(10) Risks**

Please refer to the *Risks* section of the *original REAP* proposal (Attachment 1).

**9. Stakeholder Engagement**

Stakeholder engagement will take place at the sub-project development stage and will follow the IFC rules and procedures.

**10. Gender Considerations**

Gender aspects will be given thorough consideration and addressed at the sub-project level depending on the issues and opportunities that are identified at the appraisal stage for each sub-project.

**12. Co-financing Indicators and Targets (consistent with results framework)**

Core Indicators	Original REAP	Expanded REAP (by Dec 2018 – 4 years)
<b>DIRECT IMPACTS</b>		
(a) MW of private power capacity supported & installed	105 MW	155 MW
(b) GHG emissions avoided:		
- annually <sup>5</sup> :	148,000 MtCO <sub>2</sub> e p.a.	230,000 MtCO <sub>2</sub> e p.a.
- over life-time:	3,000,000 MtCO <sub>2</sub> e over 20 years	3,450,000 MtCO <sub>2</sub> e over the 15-year life of the loan <sup>6</sup> , or 4,600,000 MtCO <sub>2</sub> e over 20 years
(c) Incremental financing	Up to US\$310 million	Up to US\$445 million

<sup>5</sup> For a representative year.

<sup>6</sup> Note that the numbers for the *expanded REAP* are calculated based on the life of the financial product (15 years) – reflecting the ability of IFC to supervise and track the actual outcomes of the investments made under the *Program*; while the numbers of the *original REAP* are calculated based on the life of the expected asset (20 years). The 20 years numbers for the *expanded REAP* are provided for comparison purposes only.

leveraged (of all, non-CTF parties)		
<b>13. Co-financing</b>		
	<b><i>Original REAP</i></b>	<b><i>Expanded REAP</i></b>
• Government	n/a	n/a
• MDB	45	105
• Private Sector (including project sponsors)	265	265
• Bilateral	TBD	75
• Others	TBD	TBD
<b>Total</b>	<b>Up to 310 million</b>	<b>Up to US\$445 million</b>
<b>14. Expected Date of MDB Approval</b>		
It is expected that the first investment under the <i>expanded Program</i> will reach IFC Board approval within 3 months of the approval of this Request for Expansion of the <i>original REAP</i> .		

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### CTF Philippines: Renewable Energy Accelerator Program (IFC) Approved on September 14, 2010

#### CTF PRIVATE SECTOR PROPOSAL

<i>Name of Project or Program</i>	Philippines Renewable Energy Accelerator Program (“REAP”)
<i>CTF amount requested</i>	<ul style="list-style-type: none"> <li>➤ Investment – up to US\$19 million equivalent</li> <li>➤ Advisory services grant component – US\$500,000</li> <li>➤ Implementation and supervision budget - US\$500,000</li> </ul>
<i>Country targeted</i>	Philippines
<i>Indicate if proposal is a Project or Program</i>	Program

#### **DETAILED DESCRIPTION OF PROGRAM**

##### ***Proposal Context:***

Consistent with the Philippine’s Country Investment Plan (“CIP”) endorsed by the CTF Trust Fund Committee on December 2, 2009, this proposal consists of programmatic initiatives to promote transformation of, and private sector development in the renewable energy (“RE”) sector. The Philippines’ CIP identified the development of renewable energy resources as one of the key strategic areas to apply CTF resources, including through direct private sector initiatives, for which the CIP allocated US\$30 million to IFC. IFC’s first programmatic proposal under the CIP is targeted at advancing direct private sector investment in RE projects. Following further discussions with project developers, financial institutions and other stakeholders, the distribution of IFC’s US\$30 million CTF allocation between RE and energy efficiency (“EE”) programs has been adjusted to meet the relative needs in the respective sectors and the objectives of the CIP. More specifically, the proposed US\$20 million for the Renewable Energy Accelerator Program (“REAP”) seeks to facilitate transformation of the private RE sector by establishing a series of direct project level interventions in the wind, biomass and solar sectors. These sectors had been underdeveloped but offer significant development potential in the Philippines. These initial investments would help demonstrate that wind, biomass and solar projects can be successful in the Philippine context, thereby helping reduce risk for future investors while also addressing some of the early entrant barriers and reducing costs. To complement this program, approval for a US\$10 million CTF allocation for the Philippines Sustainable Energy Finance Program (“PSEFP”) will be sought under a separate proposal to help address the barriers to private sector investment and increase the flow of capital to sustainable energy projects from Philippine financial institutions.

##### ***Country Context:***

The country experienced economic contraction in 1998 as an aftermath of the Asian financial crisis, after which the economy has performed reasonably well in the past several years. The year 2007 ended with the highest economic growth in decades, benign inflation, a strong balance of payments position, and an improving public sector fiscal situation. But this strong performance has not translated into poverty reduction. Between 2003 and 2006, poverty incidence increased from 30% to 33% despite average gross domestic product (“GDP”) growth of 5.4%. Both urban and rural poverty increased on average and only 4 of the 17 regions recorded improvement in the poverty headcount. Falling real incomes of families and compression of public spending contributed to the rise in poverty. There is mixed progress in achieving the Millenium Development Goals (“MDG”s). It is therefore the aim of the Government of the Philippines (“GoP”) to include poverty alleviation as one of the outcomes of the CTF assistance.

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Growth in energy use and the associated greenhouse gas emissions (“GHG”) have accompanied the economic expansion seen after the recovery from the Asian financial crisis (Figures 1 and 2). With self sufficiency level at 56%, energy demand is met partly by indigenous resources including coal, natural gas, hydropower and traditional biomass energy. The Philippines is one of few countries in the world where RE accounts for the largest share (35%) of total primary energy supply (Figure 3). The Philippines’ primary source of electricity generation is from thermal (63.9%), with geothermal and hydro contributing 18.4% and 17.5%, respectively. Biomass, solar and wind only account for 0.2% share of the generation mix. The country is experiencing regular rotating power shortages especially in the islands of Visayas and Mindanao, which takes up roughly 25% of the power consumption in the country.

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## CTF Philippines: Renewable Energy Accelerator Program (IFC) Approved on September 14, 2010

Figure 1. GDP growth

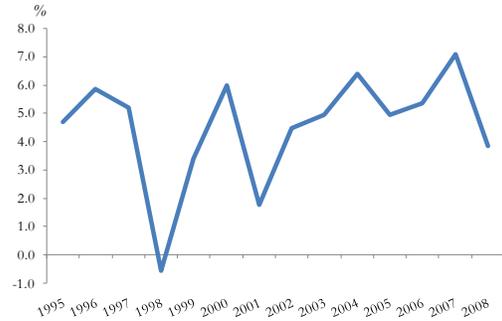


Figure 2. Energy consumption

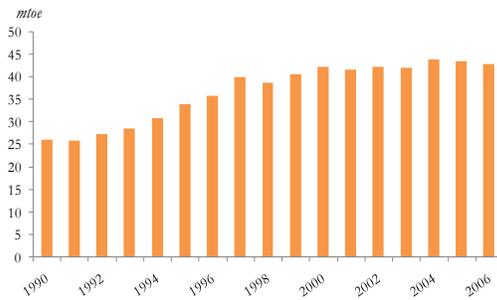


Figure 3. Primary energy mix, 2007

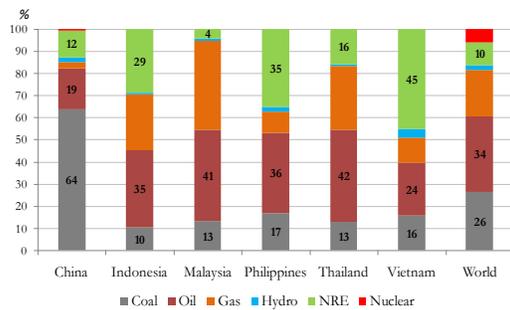
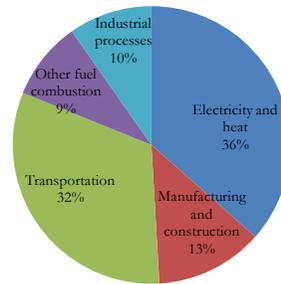


Figure 4. GHG emissions by source, 2005\*

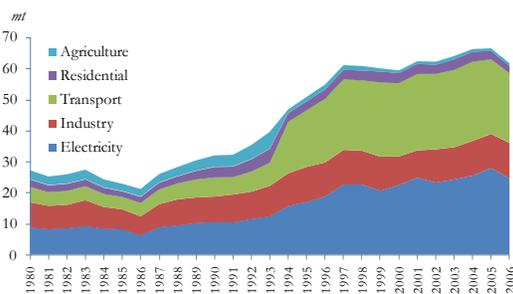


\*excludes land use change, agriculture, and forestry

Figure 5. Energy intensity



Figure 6. CO<sub>2</sub> emissions from fossil fuels



Source: World Bank, IEA and CATT/World Resources Institute

In terms of overall GHG emissions, the Philippines ranked 39th in the world in 2005 with about 142 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>e), excluding emissions due to land use change. The principal GHG emission source is the power sector (Figure 4). Based on trend in emission growth, policy conditions affecting primary energy supply and

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demand, and estimated abatement costs, the GHG reduction priorities are in the electric power and transport sectors which account for about 64 percent of total energy CO<sub>2</sub> emissions (see Figure 4). The National Economic Development Authority (“NEDA”) Board’s Cabinet-level Infrastructure Committee has endorsed the high-priority interventions, including: (i) supply- and demand-side EE and conservation in power, industry, commercial, and residential sectors; and (ii) scale-up of RE such as wind, solar and biomass energy.

GoP continues to promote power sector reforms, and development of RE through private sector investment. In January 2009, the Renewable Energy Act of 2008 (the “RE Act”) became effective, which includes the establishment of a RE Trust Fund to be capitalized in part by levies on fossil energy use. The National Renewable Energy Board was established in February 2009 to attain the objectives of the RE Act. In May 2009, the Department of Energy (“DOE”) released the implementing rules and regulations of the RE Act and in July 2009, created the Renewable Energy Management Bureau (“REMB”). Specific rules for the RE Act relating to Renewable Portfolio Standard (RPS), feed-in tariffs (“FIT”) and net metering for qualified end-users are expected to be released in the third quarter of 2010.

RE share is expected to decline relative to coal over the next two decades, even though RE capacity is expected to increase from 5 gigawatts (“GW”) of hydropower, geothermal, and other RE to a total of 12 GW (World Bank, 2009). Additional RE resources of about 5 GW may be commercially viable, but most projects face capital cost barriers and off-take risks. Small hydropower potential is estimated at 1.8 GW at 888 sites. Estimated GHG reductions for this source are 2.7 million tons of CO<sub>2</sub> equivalent per year (“Mt CO<sub>2</sub>e/y”). Total biomass power is estimated by DOE to be 2.27 GW; development of 2 GW of this potential would yield GHG reductions of 6.3 Mt CO<sub>2</sub>e/y. Wind power resources are estimated at 700 MW, which could deliver GHG reductions of about 7.1 Mt CO<sub>2</sub>e/y. Potential GHG reductions from solar power applications are estimated to be in the order of 2 MtCO<sub>2</sub>e/y.

### ***Barriers to Private Sector Investment***

The various RE resources have two common features which differ from coal and natural gas-based power: (i) the RE resources are commercially available “at the source” which may not be near the large power demand centers; and (ii) candidate RE power plants are generally smaller in scale, e.g., 50 – 100 MW per site, than coal or gas-fired power plants which are typically 200 – 300 MW per site or larger. Thus, RE power plants suffer some diseconomies of scale, higher development and initial capital cost, and higher initial cost of power production. Meanwhile, financial institutions are constrained from investing in RE due to: (i) limited awareness in the banking sector about the real potential of RE space; and (ii) lack of experience in evaluating RE projects.

### ***Program Summary:***

The RE Accelerator Program (“REAP”) represents an IFC initiative to accelerate private sector participation in RE, in particular in the more challenging wind, biomass and solar sectors in the Philippines. These three sectors have high capital costs and the FIT structure under a newly established RE Act is only expected to be finalized in the third quarter of 2010. Uncertainties with regard to sufficiency of FIT levels and implementing rules may diminish or delay private sector investment. This is particularly likely to be the case given the lack of experience in these sectors in the Philippines which increases the perceived risks and results in higher initial development costs of pioneer projects. The REAP aims to target and apply CTF funds to support private sector wind, biomass and solar projects and will address existing capital and market barriers to catalyze accelerated growth of these markets to ultimately transform the Philippines RE sector. The REAP will seek to retain flexibility (in terms of approach, project selection, and application of CTF funds) to achieve optimal structure to most effectively accelerate the implementation of these RE investments with minimum concession on a project-by-project basis. While it is expected that bulk of the CTF financing would be in

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the form of a senior debt, IFC would also consider using other products such as mezzanine or equity and subordinated loans for up to 30% of total allocation. The products will be chosen based on what can most effectively address the barriers to accelerate investment and most efficiently use CTF funds to leverage private sector capital.

The REAP will focus on wind, biomass and solar technologies, which all have significant potential for gigawatt-scale development in the Philippines. Transformation of these sectors therefore has the potential to have a material impact on the GHG emission intensity of the Philippine power sector. In each case, by supporting the rapid development and construction of some pioneering biomass, solar and wind projects under a newly established Renewable Act, while addressing a number of the key non-investment barriers through an Advisory Program, the REAP will have a substantial demonstrational and transformative role. The involvement of IFC and other bilateral and multilateral institutions as leveraging partners for the CTF funds is expected to provide confidence and learning experience to other financial institutions in financing RE projects. The REAP will help establish a track record of RE projects and build confidence in the market for other projects to follow. Solar power is currently an expensive alternative but has high potential to be the power technology of the sector in the future given rapidly declining cost and the potential for scale given the Philippines' significant solar resource. Wind power offers the potential for rapid generation capacity expansion once the initial projects succeed. Biomass power offers huge potential for development given adequate available feedstock in the Philippines and also has huge opportunities to deliver significant development impact.

IFC has been actively engaging with private sector project developers in the biomass, solar and wind sectors to get a strong sense of the most advanced and suitable projects to merit CTF support. IFC has an active pipeline of transactions that are potential recipients of CTF funding, making this an urgent program for support. Specific projects are not mentioned in this programmatic proposal given issues of confidentiality and to preserve flexibility in IFC's discussions. The projects supported by the REAP are expected to fall within the following sectors:

- Solar sector. The Philippines has nationwide potential for harnessing solar energy. Results of previous ground-based measurements of the daily total number of hours of sunshine duration, combined with the United States National Renewable Energy Laboratory's ("US-NREL") Climatological Solar Radiation (CSR) Model, showed that the country has an annual potential average of 5.1 kilowatt-hour (kWh)/m<sup>2</sup>/day. At present, there is a 960KW solar power plant which is located in Cagayan de Oro in Mindanao and a 729KW plant in Camarines Sur in Luzon. There are also 5,600 solar energy systems completed in 154 communities under the Solar Power Technology Support Project designed to install solar energy systems in about 80 Agrarian Reform Communities. The Environmental Improvement for Economic Sustainability (EIES) Project also promotes the use of photovoltaic system for rural-based electrification through the installation of 15,000 Solar Hybrid Systems (SHS) in certain target regions. Solar PV is expected to receive the highest FIT level among RE technologies under the RE Act. However, in the short-term, given very limited experience in large-scale solar power in the Philippines and uncertain FIT levels which are likely to yield only marginal returns given current capital costs of solar PV systems and the perceived risks of this "new" technology, concessional funding is necessary to support the pioneer projects and to accelerate the sector's growth to scale. In the long-term, with increased experience and capacity in the Philippines and rapidly declining capital costs for solar PV systems, the regulatory support under the RE Act should be enough to support the sector sustainably. The demonstration effect of such a project will be high, representing a first step in application of a solar technology in multi MW scale that has significant potential in the Philippines. Such a project would also serve to "pave the way" in establishing certain bureaucratic and procedural processes, making implementation easier and less costly for future developers. CTF funding is most likely to be applied as low cost, long tenor senior loans alongside IFC to catalyze commercial bank debt and to enable such a project to proceed. Given the high costs of solar power, relatively large amounts of CTF funding (up to 25% of project cost depending on FIT level) may be necessary to

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bring the project's risk/reward balance to a minimum acceptable level for a project developer to do the first project, though the project may be relatively small.

- Wind sector. The Philippines, with a large islands-based archipelago located within the trade winds belt, has significant potential for wind energy. The total resource potential has been estimated by a United States Department of Energy-funded survey at around 76,600MW, of which 7,600MW have been classified as commercially available by the GoP, after taking into account practical accessibility. According to the US-NREL, the best wind resource areas are in the north and northeast portion of the Philippines. These are the same areas where the wind projects IFC is considering supporting are located. To date, there is only one operating wind farm in the Philippines, a 25MW wind project in Ilocos Norte in the island of Luzon which started selling electricity in mid-2005 and recently expanded to 33MW. As with solar PV, it is thought that in the long-term, with increased experience and capacity in the Philippines and continued decline in capital costs for wind turbines, the regulatory support under the RE Act should be enough to ensure sustainability of the sector. In the short-term, however, with very limited experience in large-scale wind power in the Philippines and uncertain FIT levels which are likely to provide only marginal returns given today's capital costs of turbines and the perceived risks of this "new" technology, concessional funding is necessary to support the pioneer projects and to accelerate the sector's growth to scale. CTF funding is most likely to be applied as low cost, long tenor senior loans alongside IFC to catalyze commercial bank debt and to enable such projects to proceed but could also be applied as mezzanine financing to enable improved leverage which can be difficult with wind projects given the uncertainties in energy yield estimation.
- Biomass sector. The Philippines is known to have an abundance of bio-energy fuel sources at its disposal because of its extensive agricultural, forestry, and livestock industries. Potential fuel sources include bagasse, coconut residues, wood, rice husks and municipal solid waste. The Department of Energy has identified a biomass (bagasse) potential of 235 million barrels of fuel oil equivalent in the country, with Western Visayas having the biggest potential of 128MW. Despite having an abundance of potential bio-energy fuel resources in the Philippines, total installed capacity is only at 21MW. As the case is with solar and wind, biomass projects are expected to be marginally profitable in the short term given high capital costs including that for ensuring adequate feedstock supply as well as high perceived risks, such that concessional funding is needed to support the first project and to accelerate the sector's growth to scale. In the long-term, this sector is also expected to be sustainable with just the regulatory support under the RE Act with increased experience and capacity in the Philippines initially supported by CTF, and continued decline in capital costs. CTF funding is also most likely to be applied as low cost, long tenor senior loans alongside IFC to catalyze commercial bank debt and to enable such projects to proceed but could also be applied as mezzanine financing to enable improved leverage for high capital cost biomass projects that include components to ensure sustainability of feedstock supply.

Note that final agreement to provide CTF funding to any project would be subject to a full due diligence and approval by an internal IFC Approval body as well as IFC's Board, per the CTF private sector guidelines. The terms of each individual CTF transaction will be reviewed and approved by an Investment Review Committee which is independent and different from the Investment Review Committee that approves the terms of the IFC investment.

During the investment period an advisory program will be used to maximize the transformational impact of the projects financed by allowing the lessons learned to be shared with the market and by providing grant funding to address smaller scale barriers that are common to all projects and developers in the industry.

Advisory Services:

IFC currently has approximately 50 Sustainable Energy Advisory projects being implemented totaling about \$90 million. The projects roughly break down into two broad categories: renewable energy advisory and energy efficiency/renewable energy finance advisory. Roughly one-third of the projects are in Eastern Europe and Central Asia, where IFC's sustainable energy advisory program began their operations before spreading to other regions.

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The renewable energy advisory projects typically address market uptake barriers, including regulatory barriers (such as advising the government on an appropriate feed-in tariff policy for renewable energy into the grid), market information gaps (such as assessing the feasibility of certain types of renewable energy technologies in a particular country or region), or the lack of a viable business model (such as a model for telecom companies to power their base telecom stations using solar or wind energy).

Lessons from existing renewable energy advisory projects:

- **A national renewable energy strategy or policy is a necessary pre-condition for advisory services in sustainable energy.** An explicit commitment on the part of the country government in the form of a national strategy or mission or policy or an international commitment towards GHG reductions is crucial for private sector players to take an interest in developing renewable energy projects. In the absence of this type of commitment, private sector project developers are sceptical about the government's support for sustainable energy projects, and therefore, technical assistance or soft financing alone cannot overcome this fundamental weakness in market signal.
- **Establishing a feed-in tariff pricing policy is critical.** For large-scale (utility scale) deployment of renewable energy projects, regulations need to be supplemented with financial incentives for project developers to offset the higher up-front costs of renewable energy projects. Advisory services aimed at supporting appropriate feed-in tariffs and net metering/wheeling can make a big impact in helping promote private sector entry into renewable energy projects.
- **Limited capacity and market-level knowledge among operators about RE projects creates a higher perception of risk.** In many countries, where the World Bank Group operates, experience with building and operating wind, solar, biomass projects is quite limited. Other types of data/information such as optimal energy mix for the country's grid, resource procurement and storage, process and systems standardization, quality control and assurance, etc. are also missing in many of these markets. Advisory services to early leaders/first movers that leverages and transfers knowledge from international experience to local players and builds the capacity of local EPC (Engineer, Procure, Construct) contractors can contribute to the success of the project and help develop a cadre of local companies with EPC experience in renewable energy. Similarly, studies or analysis that add to market-level information (resource mapping, pre-feasibility studies, insolation data, etc.) can help reduce the risk perception of SE projects, which in turn enables more project developers to enter the RE market.

IFC has learned from experience that targeted advisory support can further accelerate the development of a country's RE sector by creating an enabling environment for future/parallel investments. However, the interventions needed to maximize impact are not always evident at the inception of a program, or may change during a program's implementation. To address this challenge but ensure that the market has the adequate support necessary to catalyze growth, IFC will develop an advisory services program that includes some basic work, while maintaining flexibility in other areas. IFC would report to the Trust Fund Committee during its annual reporting on the ultimate design of the advisory services component as it progresses. The basic advisory services component may include; capacity building, project development support, market awareness, and regulatory and institutional support. These activities will ensure that environment and social sustainability performance standards, lessons learned, and information generated through these initial projects is shared with future developers, financiers and government bodies but may also include some of the additional (or new) activities outlined as follows:

Capacity Building:

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Experience and information on RE among project developers, consultants, engineering firms, investors, lenders and regulators in the region is limited, particularly with regard to biomass, solar and wind. To foster successful solar and wind sectors in the Philippines, there needs to be adequate local capacity/knowledge among all the relevant shareholders. This local capacity will ensure successful sector growth, avoid costly mistakes and significantly reduce project construction costs making biomass, solar and wind projects more competitive. The capacity building component would enhance local capacity in the sectors by:

- a) Building local capacity of Project Development, Manufacturing, EPC and O&M contractors: conduct needs assessment to define knowledge gaps; developing tools to support market development, thus reducing upfront costs and risks for future developers and investors; develop and implement training modules; and prepare a “Project Developers’ Guide”.
- b) Conducting assessment and mitigation of key risks and biomass, solar and wind resource studies (identification of hot spots)
- c) Developing tools to support market transformation through standardization and quality assurance

#### Project Development Support:

The projects supported by the REAP may require specific project development support. This activity will ensure that the projects adhere to the IFC’s environmental and social sustainability performance standards, and meet the requirements for the financial institutions’ due diligence. The following are the likely support:

- a) Assist in project design, procurement, construction – including permits and licenses; review of feasibility studies; contract and legal support; and project management to biomass, solar and wind developers
- b) Assist the developers in establishing appropriate environmental and social standards assessments; action plans; and assessing and addressing the cumulative impacts of broader sectoral growth. Guidance will be provided to enable the projects to adapt and comply with the following performance standards: assessment and management of social and environmental risks and impacts; labor and working conditions; resource efficiency and pollution prevention; community health, safety and security; land acquisition and involuntary resettlement; biodiversity conservation and sustainable natural resource management; indigenous people; and cultural heritage.

#### Market Awareness:

(i) Disseminating lessons learned and non-confidential information obtained from early projects to regulators, project developers, and the wider stakeholder group can be an effective way to promote a better regulatory/market environment and reduce perceived risks for future project developers and private financiers. By supporting “neutral” associations (e.g. biomass, wind or solar associations) to gather, aggregate and share real-time information on the sector, stakeholders are likely to get “comfortable” with investing in the sector more quickly. Transparency, monitoring and evaluation, and knowledge management are all key elements of the CTF supported projects and a knowledge management program would be developed to ensure an effective feedback loop is created to capture and share information while managing and balancing the confidentiality requirements of the projects and developers in question.

(ii) The electricity produced by solar and wind technologies are intermittent and it would be valuable to prepare a white paper for the sector stakeholders exploring this issue and its effect on the Philippine grid. This would allow them

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to better understand the effect of solar and wind on the grid and optimize their contribution to the Philippines' energy mix. Such work would include studying the optimization of solar and wind power in the grid and analyzing the maximum capacity that the grid can handle. Such analysis could also study the impact of multiple solar and wind farms on the stability of the grid.

(iii) Developing knowledge and experience in the Philippine market for accessing carbon credit opportunities. To date, the Philippines has not been able to access the carbon market at scale. The individual private sector biomass, solar and wind power projects supported by CTF funds are expected to access the CDM carbon market, thereby having a demonstration effect for future RE projects. Dissemination of best practice in this area could support expansion of all RE technologies.

### Transaction Advisory on Off-Grid Renewable Energy Development

Present conditions in the off-grid power sector of the Philippines are attractive to the private developers because of the constant growth of the power demand in these areas, the existing mandate to encourage private sector participation, and the passage of the RE Act as the legal basis. The ongoing FIT Rules being finalized are only for the main grid areas. Exploiting Renewable Energy resources in off-grid areas with a more extensive level of private sector involvement provides an excellent opportunity to serve the objectives of both the Electric Power Industry Reform Act and the development policy set in the RE Act.

- Provide assistance to government to identify and classify off grid areas with potential in the generation of renewable energy;
- Develop the necessary legal and regulatory framework and procedures to ensure private sector participation;
- Structuring and implementation of transactions in the identified areas through a transparent and competitive selection of private sector to ensure the viability and sustainability of the project.

A combination of the above-mentioned possible instruments could facilitate the initial and future projects, help address the 'nascent technology' and 'market-based' issues and pave the way for accelerated growth of sustainable energy in the region.

### ***Describe the Proposal's strategy for achieving market transformation:***

The REAP will provide a transformational role in the Philippine power sector both by supporting early private sector participation in some of the first megawatt scale projects in three low-carbon technologies that offer the potential to contribute in gigawatt scale to the country's energy mix. The demonstration effect of the proposed projects under the REAP will include: i) demonstration for private sector participation in biomass, solar and wind RE which would pave the way for developers, investors and lenders to follow with scaled up investment; ii) demonstration of initial private sector megawatt scale projects in three technology areas which will improve capacity and breadth in the sectors providing these technologies (equipment supply, engineering, advisors etc.) and prove the technical and economic realities of these technologies in the Philippine context. CTF funding will be used to provide pioneer projects with returns commensurate to the risks taken and incentivize future investments in additional biomass, solar and wind projects and accelerate growth of these sectors.

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In addition to the direct impact of the investment projects that the REAP will support, a parallel advisory engagement is also envisaged which will support knowledge transfer from these initial projects and also be applied to any professional services which can benefit the common good of future market entrants (e.g. legal advice on negotiation of initial model contracts).

IFC will leverage its deep, international experience in biomass, solar and wind power to support developers in these first-of-kind projects. IFC has financed hundreds of megawatts of wind over the last two years in a range of geographies and under a range of regulatory environments. IFC has also financed several first of kind projects in the solar sector including the first megawatt scale PV installation in an emerging market. IFC will apply innovative structuring to apply CTF funds with minimum concession to address the key barriers that are preventing progress of private sector investment in biomass, solar and wind sectors.

### **FIT WITH INVESTMENT CRITERIA**

#### ***Potential GHG Emissions Savings***

Depending on the final allocation of funds between biomass, solar and wind technologies the REAP is expected to directly support emissions reductions of 3,039,720 tons CO<sub>2</sub>e. Assuming a 5x multiplier in terms of indirect, demonstration impact, REAP is expected have an impact in the development of 525MW resulting in reductions of 15,198,600 tons CO<sub>2</sub>e.

Biomass, solar PV and wind power are fully proven, both technically and commercially, and there are widespread examples of successful application at scale around the world. The Philippines has ample supply of a wide array of good feedstock for biomass, an excellent solar resource and some good areas of wind resource offering gigawatt scale development. Once these initial projects are implemented and provide a successful demonstration/track record, it is very feasible that the market will achieve the level of scale anticipated in this program.

#### ***Cost-Effectiveness***

Based on the above calculations and an expected program cost of US\$20 million, the implied direct GHG reductions per CTF dollar spent will be 0.15 tons CO<sub>2</sub>e/\$ during the life of the technologies and the implied indirect GHG reductions per CTF dollar spent will be 0.75 tons CO<sub>2</sub>e/\$ during the life of the technologies. Technology for the biomass, solar and wind sectors should continue to evolve leading to improved equipment pricing and lower project costs. Future projects will benefit from the learning curve that the pioneer projects will have undergone.

#### ***Demonstration Potential at Scale***

REAP seeks to support and enable the early megawatt scale private-sector biomass, solar and wind projects in the Philippines. Biomass, solar and wind projects are higher cost energy solutions and relatively larger amounts of CTF support will be necessary to enable such projects. These technologies have the potential to provide power in the gigawatt scale in the Philippines so the initial projects supported by REAP will provide a demonstration effect and could provide the impetus for at least a five-fold increase in projects. As shown in the foregoing calculations, this could provide GHG

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emission reductions of 15 MtCO<sub>2</sub>e against a current energy sector annual production of 142 MtCO<sub>2</sub>e.

REAP is expected to transform the biomass, solar and wind RE sectors into traditional, commercially viable RE sectors. In the long term, CTF will not be needed and these sectors will be sustainable because: (i) the reduced perception of risk will lower the cost of capital enabling future projects to achieve reasonable returns; and (ii) as the global markets reach scale, equipment costs will continue to fall, allowing the domestic regulatory support from the FIT to be sufficient to support future growth of the sectors. Long-term, with further technological advances and sector scale, it is expected that biomass, wind and solar can offer power at costs that are competitive with thermal technologies.

#### ***Development Impact / Co-benefits***

The expected co-benefits achieved by REAP include:

- By enabling and accelerating private sector participation in biomass, solar and wind renewable power generation in the Philippines, REAP will directly support the diversification of the country's power generation mix which is currently dependent on domestically sourced gas and coal, which are limited in supply.
- By accelerating the development of these sectors in the Philippines, related sectors (especially agriculture in the case of biomass) can also be developed and supported
- By accelerating the development of biomass, solar and wind renewable energy and supporting its achievement of critical scale in the Philippines, REAP will open up opportunities for potential future renewable energy equipment manufacture in the Philippines.
- By accelerating the development of these sectors in the Philippines, it is expected that development in neighbouring countries in South East Asia will also be supported.

#### ***Implementation Potential***

See foregoing description regarding the Philippines' biomass, solar and wind markets for details on the market context and regulatory environment.

In all cases, projects supported under REAP will seek to minimize the use of CTF funds and maximise the leverage achieved from MDBs, private sector, and carbon finance sources. The Asian Development Bank is also active in the Philippines and where opportunities exist IFC will seek to co-finance projects with the ADB. IFC has also been providing technical assistance as well as Risk-Share Facility to local banks to spur lending activities in the RE sector. IFC will explore opportunities for collaboration with ADB and local banks in financing the RE projects being considered for this program.

The US\$20 million allocation requested for this program could be quickly utilized. If this happens and funds are still available, IFC may revert to the CTF Trust Fund Committee and seek streamlined approval for reallocation of funds approved under the CIP to support expansion of this program (with support from the MDB to which the funds were originally allocated).

#### ***Additional Costs & Risk Premium:***

- CTF financing will complement the regulated FIT to be created by the GoP to support RE projects and Clean Development Mechanism revenues via the Kyoto Protocol created under the United Nations Framework Convention on Climate Change.
- Given the limited experience in grid-tied, biomass, wind and solar power in the Philippines and perceived higher

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risks of these technologies, the FIT may only provide marginal or insufficient returns given current capital costs of biomass, wind and solar PV. Concessional funding is necessary to support the pioneer projects and to accelerate the sectors' growth to a critical, sustainable scale. CTF funding is most likely to be applied as low cost, long tenor, senior loans alongside IFC to catalyze commercial bank debt and to enable such projects to proceed.

#### ***Financial Sustainability***

Biomass, solar and wind technologies have been largely undeveloped in the Philippines. The FIT and other incentives for RE under the newly established RE Act are meant to catalyze development of these technologies. Such incentives would make these sectors attractive for investors and financiers depending on specific FIT levels for each of the technologies as well as the implementing rules which are yet to be finalized. The specific FIT levels will significantly affect the profitability of the project and will also influence the project's ability to attract equity investors and lenders. Biomass, solar and wind technologies are expected to still require additional support to jump-start the first few projects due to high equipment costs and high perceived risk. The projects within REAP are expected to promote sustainability by helping establish a demonstrated track record for the technical and financial viability of private sector RE projects, and resultantly accelerate the development of the sector. Future project developers are expected to benefit from the development efforts, persistence and high costs encountered by the early movers in the sector, including the projects in REAP, which should ease the development and implementation process and lower the entry costs for future project developers. The lowering of risks, which results from the establishment of such a track record, along with improvements in the financial markets and continual reduction in equipment costs, would make the Philippines' renewable energy projects attractive without concessionary funding. By demonstrating to developers of how such investments can be made commercially viable, REAP will enable an accelerated scale-up of these sectors which will become economically sustainable over the coming years as the cost of capital and the equipment prices decrease.

#### ***Effective Utilization of Concessional Finance***

Biomass projects have not been successful in the Philippines due mainly to difficulty in ensuring sustainable feedstock supply, which results in high perceived risks and higher cost to mitigate. Solar photovoltaics show great promise for long-term cost reduction and competitive provision of low carbon power, but for now are relatively high cost forms of generation. Wind power is commercially proven worldwide but apart from in locations with particularly good wind resources, it cannot compete with the lowest-cost forms of thermal power generation. The pioneer MW-scale projects in biomass, solar and wind will face higher costs and higher risks associated with first movers and the concessionary financing will be used to address these issues. In the long-term however, it is believed that the lower cost of capital from lower perceived risk once the initial projects have been completed and the lowering equipment costs will be sufficient to enable sustainable growth of the biomass, wind and solar sectors.

Given the varying economics of the technologies considered under this programmatic proposal and the site specific economics of renewable power in general, the structuring of CTF funds will need to be tailored on a project by project basis but will always seek to maximize the use of other sources of funding (MDB, private sector, carbon finance and other concessionary sources) while minimizing the use of and concessionary nature of CTF funds. The financial markets in the Philippines are relatively liquid so that interest rates are generally competitive and low. To provide a material concession and to tangibly improve returns so that they are attractive to early market entrants, CTF loans will need to be priced at low rates.

Other concessional financing has not been used so far and is not expected to be used in similar projects in the near future

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in the Philippines. The GoP is set to implement initiatives to encourage renewable energy projects (FIT, Renewable Portfolio Standard (RPS) and certain tax incentives), but it remains to be seen if these initiatives will be adequate to reinvigorate interest in the sector. What is clear is without these initiatives and support previously, progress in biomass, wind and solar development has been very slow. To date, only 1 wind farm with a total capacity of 33MW, 2 solar farms and solar home installation with a 5MW capacity and a few biomass projects with a total capacity of 21MW are operational. The incentives under the RE Act are eliciting interest and providing the impetus for project developers to continue development work. The REAP will provide the needed boost for the first RE projects which will need concessionary funding to improve returns which may be rendered marginal by the specific FIT levels to be determined for these types of RE technologies. Over the long term, there is policy support in the form of RPS imposed on certain sectors (which may be complied with by direct generation or sourcing from eligible RE sources) to ensure sustainability after CTF.

#### ***Mitigation of Market Distortions***

The REAP is designed specifically to have a supporting rather than distorting impact on the nascent private Philippine biomass, solar and wind power sectors. The proposed REAP will provide CTF funds to individual projects and will enhance an already supportive domestic regulation that encourages renewable energy, until the sectors have reached sufficient scale to grow sustainably. It is unlikely that these pioneer projects would move forward without the concessional financing. If these did, the poor returns received would provide little incentive for replication and growth of the market to scale.

#### ***Risks***

Risks associated with the Program include:

- *Risk:* The Philippines has recently held its national elections and new national leaders starting with the President have been elected. A change in government may also impact policies governing the power sector.  
*Mitigant:* Historically, despite previous political changes, the Philippines has had a consistent track record of private sector regulation. The newly elected President has also expressed a strong desire of creating a stable and level private sector playing field. The REAP funds will also be invested alongside IFC financing and IFC will review the political and regulatory situation carefully prior to making any project level commitments.
- *Risk:* First multi-megawatt scale biomass, solar and wind private power projects in the Philippines will face risks associated with lack of experience and capacity in the sector.  
*Mitigant:* The REAP will benefit from IFC's selection of projects with the right combination of sponsors, suppliers and off-takers to maximize the chances of success as well as from IFC's global experience of financing private sector RE projects.
- *Risk:* In selecting projects to benefit from the REAP, IFC will consider a number of risks that are typical of similar transactions, including tariff and market considerations, regulatory risk, completion risk and technology concerns.  
*Mitigant:* Residual risks stemming from the inherent uncertainty of biomass, solar and wind resources, possible cost overruns and other factors can be addressed through financial structuring measures such as the establishment of minimum financial ratios, reserve accounts and sponsor support.
- *Risk:* Given that both wind and solar are relatively costly sources of energy and the regulated FIT levels are expected to be higher than other technologies, there is a risk that excess growth of these sectors could ultimately prove too expensive for the Philippine power sector and undermine sustainability.

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*Mitigant:* The Philippine regulators are aware of this risk and have observed and will benefit from the experience of Spain and other countries. Extensive stakeholder consultations are being made to ensure sustainability of the incentives under the RE Act.