World Bank Carbon Finance Unit
Carbon Partnership Facility
2011 Annual Meeting

CPF Tranche I Pipeline
World Bank Carbon Finance Unit
Carbon Partnership Facility
2011 Annual Meeting

Brazil Caixa Solid Waste Management Program
Background and Rationale

Background of the Brazilian Solid Waste Sector:

- Poor solid waste management:
  - High number of uncontrolled waste dump sites (75% total waste, 84% Brazil GHG Emissions)
  - High environmental and social liabilities
- Lack of investments in the sector
  - Decentralized responsibilities to municipalities with limited investment capacity and access to credit for SWM services
  - Limited private sector interest
  - Only 1% of CAIXA’s investment portfolio
- The National Solid Waste Policy Law (August, 2010)
  - Municipal and state governments are given two years to prepare a solid waste management plan, including setting targets for participation of waste pickers cooperatives
  - Garbage dumps must be eradicated within 4 years

Rationale of the Program:

- Strengthening operations in the Solid Waste Management sector linked to Carbon Finance
- Improving investment conditions in the public and private sector
- Enabling public entities to access carbon markets through innovative financing packages in the SWM sector
BRAZIL INTEGRATED SOLID WASTE MANAGEMENT PROGRAM

Program Description

- **PoA Type:**
  - Landfill gas Methane capture and use (flaring, electricity generation)

- **PoA Coordinator/Managing Entity (CME):**
  - Caixa Economica Federal (Caixa)
  - Caixa signed SPA with CPF

- **Objectives:**
  - Reduce environmental and social impacts and GHG emissions from the solid waste management sector
  - Strengthen Caixa’s capacity to manage carbon finance projects.

- **Contract Volume:**
  - 3 million tCO2e in ER Volume + 2 million tCO2e in Options

- **Methodology:**
  - ACM0001: Consolidated baseline and monitoring methodology for landfill gas project activities --- Version 11.0

- **World Bank Operations/Safeguards:**
  - World Bank loan to Caixa to finance landfill upgrading
  - Pilot program for Country Systems
BRAZIL INTEGRATED SOLID WASTE MANAGEMENT PROGRAM

Potential Projects

- 5 landfills identified for their inclusion in CAIXA's portfolio. The Project developer is the company Haztec Tecnologia e Planejamento Ambiental, S.A. (HAZTEC).

<table>
<thead>
<tr>
<th>#</th>
<th>Project Name</th>
<th>Annual average</th>
<th>Until 12/31/2012</th>
<th>10 years (2011-2020)</th>
<th>Planned commissioned date</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Itaoca</td>
<td>22,915</td>
<td>67,559</td>
<td>232,552</td>
<td>8/1/2011</td>
<td>Individual project</td>
</tr>
<tr>
<td>2</td>
<td>CTR Candeias</td>
<td>173,589</td>
<td>170,694</td>
<td>1,549,223</td>
<td>8/1/2011</td>
<td>Individual project</td>
</tr>
<tr>
<td>3</td>
<td>CTR Santa Rosa</td>
<td>869,710</td>
<td>151,775</td>
<td>7,178,641</td>
<td>7/1/2012</td>
<td>1st CPA of PoA</td>
</tr>
<tr>
<td>4</td>
<td>CTR São Gonçalo</td>
<td>114,772</td>
<td>32,126</td>
<td>1,047,854</td>
<td>7/1/2012</td>
<td>2nd CPA of PoA</td>
</tr>
<tr>
<td>5</td>
<td>CTR Barra Mansa</td>
<td>37,931</td>
<td>12,722</td>
<td>347,394</td>
<td>7/1/2012</td>
<td>3rd CPA of PoA</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>1,218,918</td>
<td>434,876</td>
<td>10,355,665</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Itaoca and CTR Candeias are Individual CDM Projects in the latest stages of the validation process that are expected to be registered in 2011.
- The first 4 identified projects have delivery commitments with the Spanish Carbon Fund (total volume: 480,000CERs) until the end of 2013.
- In addition to these projects, CAIXA has already identified other eligible CDM Project Activities (CPAs) for the PoA, which will allow CAIXA to have more flexibility managing the delivery of CERs. Those projects will also have CAIXA's financing for their implementation.
- In the long-term, a scaling up of the program is expected, targeting up to 30 new sanitary landfills in municipalities with over 200,000 inhabitants.
### Potential Projects (ER Estimation by year)

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Itaoca</td>
<td>26,317</td>
<td>41,243</td>
<td>33,213</td>
<td>27,462</td>
<td>23,264</td>
<td>20,129</td>
<td>17,728</td>
<td>15,839</td>
<td>14,312</td>
<td>13,045</td>
<td>232,552</td>
</tr>
<tr>
<td>2</td>
<td>CTR Candeias</td>
<td>40,091</td>
<td>130,603</td>
<td>143,543</td>
<td>153,524</td>
<td>161,434</td>
<td>167,874</td>
<td>180,673</td>
<td>186,015</td>
<td>190,671</td>
<td>194,796</td>
<td>1,549,223</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total Individual Projects</strong></td>
<td><strong>66,408</strong></td>
<td><strong>171,846</strong></td>
<td><strong>176,756</strong></td>
<td><strong>180,986</strong></td>
<td><strong>184,697</strong></td>
<td><strong>188,003</strong></td>
<td><strong>198,401</strong></td>
<td><strong>201,854</strong></td>
<td><strong>204,983</strong></td>
<td><strong>207,841</strong></td>
<td><strong>1,781,775</strong></td>
</tr>
<tr>
<td>3</td>
<td>CTR Santa Rosa</td>
<td>151,775</td>
<td>505,016</td>
<td>674,046</td>
<td>795,321</td>
<td>876,501</td>
<td>959,950</td>
<td>1,014,825</td>
<td>1,079,768</td>
<td>1,121,438</td>
<td></td>
<td>7,178,641</td>
</tr>
<tr>
<td>4</td>
<td>CTR São Gonçalo</td>
<td>0</td>
<td>32,126</td>
<td>57,562</td>
<td>86,731</td>
<td>109,883</td>
<td>128,292</td>
<td>142,961</td>
<td>154,674</td>
<td>164,050</td>
<td>171,574</td>
<td>1,047,854</td>
</tr>
<tr>
<td>5</td>
<td>CTR Barra Mansa</td>
<td>12,722</td>
<td>22,795</td>
<td>30,784</td>
<td>37,131</td>
<td>42,184</td>
<td>46,216</td>
<td>49,439</td>
<td>52,023</td>
<td>54,100</td>
<td></td>
<td>347,394</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total PoA</strong></td>
<td>0</td>
<td>196,623</td>
<td>585,373</td>
<td>791,561</td>
<td>942,335</td>
<td>1,046,978</td>
<td>1,149,127</td>
<td>1,218,939</td>
<td>1,295,842</td>
<td>1,347,113</td>
<td>8,573,890</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td>66,408</td>
<td>368,468</td>
<td>762,129</td>
<td>972,547</td>
<td>1,127,032</td>
<td>1,234,981</td>
<td>1,347,528</td>
<td>1,420,793</td>
<td>1,500,825</td>
<td>1,554,954</td>
<td>10,355,665</td>
</tr>
</tbody>
</table>

### Annual ER Generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Itaoca</th>
<th>CTR Candeias</th>
<th>CTR Santa Rosa</th>
<th>CTR São Gonçalo</th>
<th>CTR Barra Mansa</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td></td>
<td></td>
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<tr>
<td>2012</td>
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<tr>
<td>2020</td>
<td></td>
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</tbody>
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**Carbon Finance**

*At the World Bank*
Financing scheme of the PoA

- An innovative instrument that combines Financing, Technical assistance (SWM, CDM and social aspects) and CDM revenue stream as partial guarantee
Additionality features of the PoA

◆ Additionality at the PoA level is justified by the following arguments
  ▪ Caixa provides financing to the development of the projects
  ▪ Caixa accepts the future carbon revenues as partial guarantee towards the loan
  ▪ Caixa provides technical assistance to the municipality to structure the SWM operation (preparation towards a private concession of the landfill, bidding documents, etc)
  ▪ Caixa provides a special fund (JSDF) to address the social aspects of the landfills
  ▪ Caixa provides technical assistance on the CDM cycle
## Implementation and Next Steps

### Implementation Status

#### First CPA:
- **CTR Santa Rosa (6 MtCO₂e between 2012-2018)**
  - LoI signed with Caixa
  - Landfill commissioned on 20 April, 2011
  - LFG system to be commissioned in July, 2012

#### Additional CPAs:
1. **São Gonçalo (0.7 MtCO₂e between 2012-2018)**
2. **Barra Mansa (0.24 MtCO₂e between 2012-2018)**
   - LoI signed with Caixa
   - Landfill to be commissioned by the end of 2011
   - LFG system to be commissioned in July, 2012

#### Isolated Projects selling post-2012 CERs to Caixa:
1. **Itaoca (0.2 MtCO₂e between 2012-2018)**
2. **Candeias (1.1 MtCO₂e between 2012-2018)**
   - LoI to be signed with Caixa by the end of May
   - LFG system to be commissioned in August, 2011

### CDM Status

#### PoA Validation Status (ongoing):
- The PoA-DD and the CPA-DD published in Sept. 2010
- The first validation site visit by the DOE took place in October 2010
- Answers to the first validation protocol already submitted
- Started validation of 2nd CPA
- PoA validation expected to conclude in 2011
- DNA LoA to be processed once validation is completed
- Registration estimated by mid-2012

#### Isolated Projects Registration Status (ongoing):

### Next Steps/Timetable

- Submission of Program to CPF Buyers for inclusion in the First Tranche portfolio in May 2011
- Approval of CPF General Conditions and ERPA template
- ERPA Negotiations
- ERPA Signing
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

MOROCCO SOLID WASTE MANAGEMENT PROGRAM
Morocco Municipal Solid Waste Management Program

Program Highlights

◆ **Objective:** The objective of the Program of Activities is to reduce greenhouse gas emissions (methane and carbon dioxide) through flaring and/or use of landfill gas for energy generation.

◆ **Strategic Relevance:** The Program is strategically linked to two development policy loans granted by the World Bank to the Moroccan government as part of a national program to modernize the sector. The two loans are well aligned with the World Bank Group Country Partnership Strategy for Morocco.

◆ **Program Overview:**
  - Development of 8-10 landfill gas management projects (CPAs) for flaring of CH4 or use for energy generation
  - CPAs are implemented and financed by private sector operators, and are included in the contracts with municipalities
  - Carbon Finance has been an integral part of the Program design.
  - Contract volume of two million tCO2e from 2012-2018

◆ **Scaling up potential:** For the moment, the program targets only some of the main urban areas of Morocco. It could be scale up to include most medium-size cities as well.

◆ **Coordinating and Managing Entity (C/ME):** Fonds d’Equipement Communal, the main Moroccan local development bank (public entity)
Morocco Municipal Solid Waste Management Program

**Contract Volume:** 2 million tCO2e from 2012-2018

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
</table>
| ◆ The first CPA Oum Azza landfill (1400 tons/day) will be constructed in the fall of 2011. Expected commissioning date is 01/03/2012. | ◆ Validation Status:  
  - Preparation of the 2nd response to the DOE after a few more items of evidence is collected will be underway. DOE 2nd response expected to be completed by the end of June 2011.  
  - Host Country DNA Letter of Approval (LoA) signed in July 2010. |
| ◆ MoUs have been signed with 3 other municipalities (for 4 additional CPAs), which have expressed their formal interest in joining the CPF program. | ◆ Registration Status:  
  - Target submission for registration set for March 2012. |
| ◆ Discussions are ongoing with several additional municipalities who are expected to join the program as soon as it is registered. |  |
| ◆ CADF Grant Agreement has been signed and is now available to FEC for the preparation of the Program. |  |

**Next Steps/Timetable**

◆ **Submission of Program to CPF Buyers** for inclusion in the First Tranche portfolio in July/September 2011.
◆ **ERPA Negotiation and signing** in October/November 2011.
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

CHINA HEBEI REGIONAL FARM BIOGAS PROGRAM
China Hebei Regional Farm Biogas Program

◆ **Strategic Context:**
  - China targets installation of 20 million biogas digesters at household level and 8,000 biogas plants at single farm level by 2015. Building on WB’s experience in two CDCF biogas projects in China (household and farm level), WB is supporting Ministry of Agriculture to set up a provincial platform that will use carbon finance to overcome investment and technical barriers and accelerate program implementation.

◆ **Program Description:**
  - By replacing current practice of anaerobic open lagoons with biogas digesters, the program aims to improve manure management systems in about 40 livestock farms in 11 prefectures of Hebei province in China. The generated biogas will be used to provide power and thermal energy for the farms and households nearby.

◆ **Implementation:**
  - ERPA will be signed with Guorun Green Agriculture Co, Ltd, a bundling agency at provincial level, who will act as program CME in charge of bundling carbon transaction.

◆ **Finance:**
  - Each participating farm will receive partial subsidy from provincial government covering less than 1/3 of total investment cost and no more than RMB 1 million, the rest will be financed by the CPA participants’ own savings and equity.
China Hebei Regional Farm Biogas Program

- **Estimated Emission Reductions:**
  - 3.37 million tCO2e over the 10-year crediting period

**Innovation**

- **Building domestic capacity**
  - Agriculture sector is seriously under-represented in the carbon market. Too dispersed activities, high transaction cost, weak capacity of the coordinating entity are the main reasons.
  - The provincial entity will build critical capacity through the first PoA in agriculture sector in China and build a showcase for other provinces.

- **Private-public partnership**
  - Main investment will come from farmers and private sector companies while the public-sector coordinating entity provide technical support, M&V, and maintenance services.

- **Strengthened maintenance and service system** to increase survival rate of biogas digesters and to provide technical assistance that was under-funded in the previous national subsidy programs.
China Hebei Regional Farm Biogas Program

**Contract volume: 1.2 million tCO2e**

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ Construction of first CPA started after GSP date of May 11, 2011</td>
<td>◆ Validation Status (ongoing): The generic CPA-DD, PoA-DD and first specific CPA-DD have been published on UNFCCC website on May 11, 2011</td>
</tr>
<tr>
<td>◆ CPA Identification: CME has identified 40 potential farms to be included in the PoA</td>
<td>◆ Validation site visit is scheduled in mid-July, 2011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Next Steps/Timetable</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ <strong>Submission of Program to CPF Buyers</strong> for inclusion in the First Tranche portfolio in Fall 2011</td>
</tr>
<tr>
<td>◆ <strong>ERPA Signing</strong> in December 2011</td>
</tr>
<tr>
<td>◆ <strong>Registration Status:</strong> Estimated for September 2012</td>
</tr>
</tbody>
</table>
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

AMMAN GREEN GROWTH PROGRAM
Objective: Pioneer and demonstrate the efficacy of the city-wide approach to carbon finance, being used for the first time by combining approved methodologies in a single PoA

Scale: 560,000 ton Co2e / yr from multi sectors

Origin: Multi donor contributions
- To date GAM, AFD and KFW financing
- World Bank lending has been requested
Amman Green Growth Program

- **CME**: Greater Amman Municipality (GAM)
- **PoA coverage**: Multi sectors at the city level
- **PoA lifetime**: 28 years
- **Rationale for development**: promote low carbon investments and policies that will sustain economic growth in the city of Amman; improve the urban environment while contributing to the climate agenda; improve the cost efficiency of municipal services; and mobilize additional sources of revenues and investment funds through increasing Jordan’s access to “green funds”, including carbon markets.
## Amman Green Growth Program

### Expected contract volume – 1.5 - 2 million tCO2e

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several potential CPAs are moving in parallel:</td>
<td>◆ PoA-DD and first CPA-DD (energy efficiency in street lighting) have been prepared and submitted to the EB with a proposed consolidated approved methodology utilizing a multi-sectoral approach (city wide)</td>
</tr>
<tr>
<td>◆ Street lighting: pre-feasibility study was conducted by GAM based on which the CPA was drafted. GAM decided to analyze more broadly all options available in order to better manage its street lighting system and improve its energy efficiency. IFC working with GAM to conduct a study</td>
<td>◆ Program will be submitted for validation in Sept / Oct 2011</td>
</tr>
<tr>
<td>◆ Solar water heaters: COWI firm was selected under WB/PPIAF funding to perform a feasibility study for a solar water heating (SWH) promotion program in Amman</td>
<td>◆ Contracting for a DOE is in progress (planned for August / Sept 2011)</td>
</tr>
<tr>
<td>◆ BRT: Construction under the first works / pilot is well advanced. The second package commissioning scheduled 2014</td>
<td></td>
</tr>
</tbody>
</table>

### Next Steps/Timetable

- POADD and 2 CPA (BRT and street lighting or solar water heater) finalization
- Hiring of consulting firm for support in setting-up institutional framework for the AGGP, capacity building, etc.
- DOE hiring
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

VIETNAM RENEWABLE ENERGY PROGRAM
Vietnam Renewable Energy Development Program (REDP)

Program Highlights

◆ **Objective:** The objective of the Program is to increase the supply of electricity to the national grid from renewable energy sources on a commercially, environmentally and socially sustainable basis


◆ **Program Overview:**
  - Development of 20 – 25 small hydropower projects (CPAs) with total installed capacity of around 250 MW
  - REDP World Bank Credits (US$ 202 mil) are available through financial intermediaries
  - Carbon Finance has been an integral part of the Program design.
  - Contract volume of two million tCO2e from 2012-2020

◆ **Scaling up potential:** The project represents around 9 % of total potential small hydropower in Vietnam which is estimated to be around 2,900 MW which could generate more than 6 million tCO2e of GHG emission reductions, annually

◆ **Coordinating and Managing Entity (C/ME):** Ministry of Industry and Trade is the main counterpart of the Bank loan and also serves as C/ME
Vietnam REDP: Potential Delivery Schedule

Cumulative Emission Reductions for Group 1 and 2, 2012 - 2020

- Group 1
- Group 2

Emission Reductions (tCO2e)

ERPA Volume

Carbon Finance
AT THE WORLD BANK
**Vietnam Renewable Energy Development Program (REDP)**

**Contract Volume: Two million tCO2e from 2012-2020**

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ The first CPA Sung Vui (18 MW) hydropower project is under construction</td>
<td></td>
</tr>
<tr>
<td>◆ Three projects have expressed their interest in joining the CPF program under the REDP.</td>
<td></td>
</tr>
<tr>
<td>◆ As of February 2011, MOIT has received 25 new applications with the total capacity of 342.2 MW to be considered for the REDP financing. Initial screening is being carried out to firm up the pipeline.</td>
<td></td>
</tr>
<tr>
<td>◆ <strong>Validation Status:</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Preparation of the 2nd response to the DOE after a few more items of evidence is collected will be underway. DOE 2nd response expected to be completed by the end of mid June 2011</td>
<td></td>
</tr>
<tr>
<td>▪ Host Country DNA Letter of Approval (LoA) signed on 10 February 2011</td>
<td></td>
</tr>
<tr>
<td>◆ <strong>Registration Status:</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Target submission for registration set for September 2011</td>
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</table>

<table>
<thead>
<tr>
<th>Next Steps/Timetable</th>
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</thead>
<tbody>
<tr>
<td>◆ <strong>Submission of Program to CPF Buyers</strong> for inclusion in the First Tranche portfolio in July 2011</td>
</tr>
<tr>
<td>◆ <strong>ERPA Negotiation and signing</strong> in September 2011</td>
</tr>
</tbody>
</table>
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

TANZANIA RENEWABLE ENERGY PROGRAM
Sectoral Overview

- Limited installed capacity (1,000 MW)
- Limited grid coverage
- Less than 15% of the country has electricity access. In rural areas, access is about 2%
- Abundant, but largely untapped renewable energy resources, which could be harnessed for power generation and access expansion
- Government of Tanzania has taken several steps in the right direction to promote and accelerate the pace of rural electrification and create an enabling environment to attract private investment into the sector
  - Established a dedicated institution (Rural Energy Agency – REA) to promote and facilitate improved access to modern energy services in rural areas
  - Has developed appropriate legal framework to govern the RE sector - Private sector can enter into direct distribution in off-grid areas; $500USD per rural connection subsidy provided by REA
  - Developed Standard Power Purchase Agreement for Small Power Developers (Tariff based on avoided Costs)
  - Addressing the long term financing issue by having a line of credit from the World Bank
  - Addressing the capacity issue through technical assistance
Tanzania Renewable Energy Program

**Objective:** Expand coverage of rural electrification in Tanzania, by promoting both off-grid and on-grid renewable energy projects.

**Strategic Relevance:** The Program is strategically aligned with Tanzania’s Energy Sector Policy. The World Bank and several other donors are actively engaged in the power sector and an IDA project supporting rural electrification is presently under implementation.

**Program Overview:**
- Development of 10-12 small renewable energy generation projects (CPAs) with total installed capacity of around 100 MW
- Contract volume of about 2.0 million tCO2e from 2013-2020
- The Program seeks to address the sectoral issues through an integrated approach
  - Technical Assistance – capacity building of both project developers and banks (IDA and other donors)
  - WB TEDAP Credit Line – long term financing through local banks
  - Matching Grant – financing upfront project preparation cost
  - Performance Grant – a form of capital subsidy (depending upon the number of rural connections provided)
  - Carbon Finance - bridging part of equity gap

**Scaling up potential:** Tanzania has abundant renewable resources. Therefore, the scaling up potential is huge

**Coordinating and Managing Entity (C/ME):** The Rural Energy Agency (REA), who also happens to be the main counter part of the IDA project, would serves as the C/ME
## Financing Plan of the Program

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>%</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt Financing</td>
<td>70%</td>
<td>Long term debt from local banks enabled by World Bank Line of Credit</td>
</tr>
<tr>
<td>Equity Requirement</td>
<td>30%</td>
<td>To be arranged by the Project Developers</td>
</tr>
<tr>
<td>In Kind Equity (5%)</td>
<td></td>
<td>Valuation of Promoters’ efforts in getting water right, land, preparatory works etc.</td>
</tr>
<tr>
<td>Cash Equity (10-15%)</td>
<td></td>
<td>Typical availability (based on actual data from several projects)</td>
</tr>
<tr>
<td>Performance Grants (5%)</td>
<td></td>
<td>Based on number of connections provided (banks accept this as promoter’s equity)</td>
</tr>
<tr>
<td>Equity Gap (5-10%)</td>
<td></td>
<td>Needs to be addressed through market based solutions/donor grants</td>
</tr>
</tbody>
</table>

Matching the local bank’s high equity requirements is a challenge for the local developers/sponsors.
The Proposed Carbon Equity Advance Scheme

Working Mechanism for CPF Carbon Advance
- REA signs ERPA with CPF
- Carbon advance revolving account held by REA pays the carbon advance money agreed with promoters, as equity into project at the time of EPC contract signing
- CPF replenishes the revolving Account upon program registration and project commissioning
- REA guarantees up to 20% for CPF advances in a CER guarantee account to top up any shortfalls in CERs
Simulation of Upfront Resource Requirement for the Carbon Equity Advance Scheme (US$ 9.27 Mil)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Units</th>
<th>Total</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Addition Plan</td>
<td>MW</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Investment required</td>
<td>Mil. US$</td>
<td>250.00</td>
<td>37.50</td>
<td>50.00</td>
<td>62.50</td>
<td>75.00</td>
<td>25.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Equity: Min (5% investment or 100% contract value)</td>
<td>% of investment</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>4.4%</td>
<td>3.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disbursement of carbon Equity from Revolving Account</td>
<td>Mil. US$</td>
<td>11.71</td>
<td>1.88</td>
<td>2.50</td>
<td>3.13</td>
<td>3.33</td>
<td>0.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Contract Value @80% and @ 7 Euro/tCO2</td>
<td>Mil. US$</td>
<td>13.31</td>
<td>2.66</td>
<td>3.10</td>
<td>3.33</td>
<td>3.33</td>
<td>0.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replenishment received from CPF (@50% Contract)</td>
<td>Mil. US$</td>
<td>6.65</td>
<td>1.33</td>
<td>1.55</td>
<td>1.66</td>
<td>1.66</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contribution of CPF Advance Payment on Investment</td>
<td>% of Investment</td>
<td>3.5%</td>
<td>3.1%</td>
<td>2.7%</td>
<td>2.2%</td>
<td>1.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitalization of CER Guarantee Account (@20% )</td>
<td>Mil. US$</td>
<td>1.33</td>
<td>0.27</td>
<td>0.31</td>
<td>0.33</td>
<td>0.33</td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amount needed in the Revolving Account</td>
<td>Mil. US$</td>
<td>5.06</td>
<td>1.88</td>
<td>2.50</td>
<td>1.79</td>
<td>1.77</td>
<td>-0.78</td>
<td>-1.66</td>
<td>-0.44</td>
</tr>
<tr>
<td>Total Amount Needed (RA + GA)</td>
<td>Mil. US$</td>
<td>6.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-2.88</td>
</tr>
<tr>
<td>Funds committed by donors</td>
<td>Mil. US$</td>
<td>6.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Funds Needed</td>
<td>Mil. US$</td>
<td>2.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Tanzania Renewable Energy Program**

**Contract Volume: Two million tCO2e from 2013-2020**

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
</table>
| ◆ The first CPA (10 MW) hydropower project is already identified and is at financial closure stage | ◆ Validation Status:  
  ▪ The PDD is under preparation  
  ▪ Validation to start in September, 2011 |
| ◆ Several other projects who have completed their feasibility studies have expressed interests in joining the CPF program with REA. | ◆ Registration Status:  
  ▪ Target registration date: October, 2012  
  ▪ The program is located in an LDC (deadline of registration by December, 2012 not applicable) |
| ◆ About 60 MW aggregated capacity is expected to be implemented by 2015 and 100 MW by 2017 | |

**Next Steps/Timetable**

| ◆ Signing of Seller Participant Agreement: June 2011 |
| ◆ Submission of Program to CPF Buyers for inclusion in the First Tranche portfolio: Fall 2011 |
| ◆ ERPA Negotiation and signing: Fall 2011 |
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

THAILAND CLEAN ENERGY PROGRAM
THAILAND - Renewable Energy (RE) and Energy Efficiency (EE) Programs

Program Highlights

◆ **Objective:** Increase the supply of renewable electricity to the national grid and reduce energy consumption for Highway Street lighting, nationwide.

◆ **Strategic Relevance:** The Program is strategically aligned with Thailand National Economic and Social Development Plan 2007-2011, Alternative Energy Development Plan 2008-2022, as well as the World Bank Group Country Partnership Strategy for Thailand

◆ **Program Overview:**
  - **Renewable Energy (RE) Program:** Development of up to 100 x 1 MW (CPAs) biomass gasification power plants with total installed capacity of around 100 MW
  - **Energy Efficiency (EE) of National Highway Street Lighting Program:** Replacement of up to 500,000 High Pressure Lamps with LED lamps
  - Carbon Finance has been an integral part of the Program design
  - Contract volume of one million tCO2e from 2013-2020

◆ **Scaling up potential:** The project represents only 2.5% of total potential biomass in Thailand which is estimated to be around 4000 MW which could generate more than 14 million tCO2e of GHG emission reductions, annually.

◆ **Coordinating and Managing Entity (C/ME):** Provincial Electricity Authority Energy Company (PEA-ENCOM) who is the one of the main counterparts of the on-going World Bank loan (CTF and IBRD) also serves as C/ME
THAILAND - Renewable Energy (RE) and Energy Efficiency (EE) Programs

Contract Volume: One million tCO2e from 2013-2020

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ The program financing through the World Bank is under preparation with the target Board date of Q3 CY 2012</td>
<td></td>
</tr>
<tr>
<td>◆ Pre-feasibility studies are completed</td>
<td></td>
</tr>
<tr>
<td>◆ The sites of the first CPA for both programs have been identified</td>
<td></td>
</tr>
</tbody>
</table>

◆ Validation Status:
  ▪ POA-DD and CPA-DD for both programs are being finalized. Expected site visit in July 2011
  ▪ Program should complete validation by July 2012
  ▪ DNA Letter of Approval (LoA): Expected to be granted by December 2011

◆ Registration Status:
  ▪ Complete submission or registration by December 31, 2012

Next Steps/Timetable

◆ Submission of Program to CPF Buyers for inclusion in the First Tranche portfolio in May 2012
◆ ERPA signing in September 2012
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

EGYPT WIND PROGRAM
Egypt Wind Development Program

- **Objective:** support the development of Egypt’s ample wind resources in the Gulf of Suez, to provide additional power supply to meet Egypt’s growing demand and to increase the share of renewable resources (GoE strategy of increasing the share of renewables to 20% of total generation by 2020) through development of necessary infrastructure (transmission network)

- **Scale:** Up to 3000MW by 2020

- **Origin:** World Bank financed project
  - **Component B** - Technical Assistance (US$ 2.9 million)
  - **Component C** - Gulf of Suez 250 MW BOO project (US$ 450 million): development and construction of a 250 MW wind farm (1st CPA) in Gulf of Suez by a private sector operator under a BOO approach
Egypt Wind Development Program

- **CME**: Egyptian Electricity Transmission Company (EETC)

- **PoA coverage**: Up to 3000 MW; any subsequent projects can be included, if developed

- **PoA lifetime**: 28 years

- **Rationale for development**: World Bank’s financed transmission infrastructure project is enabling development and integration of wind projects into the grid;
  - *No infrastructure component, difficult to develop wind projects*
Egypt Wind Development Program

- **Project Start Date:** mid 2014

- **Schedule of implementation:**
  - **First CPA** (250 MW) commissioned by 2014 (approx. 400k ERs / yr.)
  - **Second CPA** (500 MW) commissioned by 2015 (approx. 800k ERs / yr.)
  - **Third CPA** (500 MW) commissioned by 2016 (approx. 800k ERs / yr.)

- **First CPA status:**
  - Competitive bidding tender process started May 2009, short-listing of 10 international consortiums (IC)
  - Wind measurements started Oct. 2011 for 1 year
  - Draft RFP in fall 2011 (Oct. / Nov.)
  - Final RFP by Feb 2012
  - Contract is planned to be awarded by June 2012
  - Project commissioned planned by mid 2014
## Egypt Wind Program

### Expected contract volume -- 2 million tCO2e

<table>
<thead>
<tr>
<th>Implementation Status</th>
<th>CDM Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ First CPA:</td>
<td>◆ POADD and CPA drafted by September 2011</td>
</tr>
<tr>
<td>◆ Competitive bidding tender process started May 2009, short-listing of 10 ICs</td>
<td>◆ Validation start up planned for October / November 2011</td>
</tr>
<tr>
<td>◆ Wind measurements Oct. 2010 to Sept 2011</td>
<td>◆ Registration expected in 2013</td>
</tr>
<tr>
<td>◆ Draft RFP in fall 2011 (Oct. / Nov.)</td>
<td></td>
</tr>
<tr>
<td>◆ Final RFP by Feb 2012</td>
<td></td>
</tr>
<tr>
<td>◆ Contract awarding planned by June 2012</td>
<td></td>
</tr>
<tr>
<td>◆ Project commissioning planned by mid 2014</td>
<td></td>
</tr>
</tbody>
</table>

### Next Steps/Timetable

- Local CDM / RE expert hired by June 1st 2011
- 2 weeks preparation mission planned for second half of July 2011
- SPA signature planned for September / October 2011
WORLD BANK CARBON FINANCE UNIT
CARBON PARTNERSHIP FACILITY
2011 ANNUAL MEETING

PIPELINE CALENDAR AND ASSESSMENT
Calendar for Presentation of Programs to Buyers

- Caixa SWM – May 2011
- Vietnam RE – July 2011
- Morocco SWM – July/September 2011
- China Hebei Biogas – Fall 2011
- Tanzania RE – Fall 2011
- Thailand Clean Energy – Spring 2012
- Amman Green Growth – to be determined
- Egypt Wind – to be determined
## CPF Pipeline -- Expected Contract Volumes and Values

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Volume (MtCO2e)</th>
<th>Value at 7.50 EUR/ton (EUR million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contract</td>
<td>Options</td>
</tr>
<tr>
<td>Vietnam: RE Program</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Morocco: MSW Program</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Brazil: Caixa SWM Program</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>7</strong></td>
<td><strong>4</strong></td>
</tr>
<tr>
<td>China: Farm and Household Biogas Program</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Thailand: Clean Energy Program</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>2</strong></td>
<td><strong>0.5</strong></td>
</tr>
<tr>
<td>Egypt: Wind Development Program</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Jordan: Amman Green Growth Program</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tanzania: Renewable Energy Program</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>4.5</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13.5</strong></td>
<td><strong>5.5</strong></td>
</tr>
</tbody>
</table>

Carbon Fund with EUR 132.5m in commitments less 9% CADF charge) 121

Category A: SPA signed and Program in Validation; reasonable chance of delivery
Category B: SPA recently signed; reasonable chance of registration by end of 2012 and of delivery
Category C: For registration after 2012 (deadline not relevant for Tanzania program)