

## PROJECT IDEA NOTE (PIN)

Name of Project: Wambu Hydropower Project, Santo Island, Vanuatu

Date finalized: May 2012

### Description of size and quality expected of a PIN

Basically a PIN will consist of approximately 5-10 pages providing indicative information on:

- the type and size of the project
- its location
- the anticipated total amount of greenhouse gas (GHG) reduction compared to the “business-as-usual” scenario (which will be elaborated in the baseline later on at Project Design Document (PDD) level)
- the suggested crediting life time
- the suggested Certified Emission Reductions (CERs)/Emission Reduction Units (ERUs)/Verified Emission Reduction (VERs) price in US\$ or €/ton CO<sub>2</sub>e reduced
- the financial structuring (indicating which parties are expected to provide the project's financing)
- the project's other socio-economic or environmental effects/benefits

**While every effort should be made to provide as complete and extensive information as possible, it is recognised that full information on every item listed in the template will not be available at all times for every project.**

## A. PROJECT DESCRIPTION, TYPE, LOCATION AND SCHEDULE

<b>OBJECTIVE OF THE PROJECT</b> <i>Describe in not more than 5 lines</i>	<p>Electricity supply throughout Vanuatu is dominated by diesel generation resulting in very high tariff. The Espiritu Santo island (largest island in Vanuatu) where the proposed run-of river hydro project is planned is virtually un-electrified except for town of Luganville (second largest town after Port Villa in Vanuatu). The project activity aims to improve the electricity access in the region through the development of on grid renewable energy for rural areas. The project activity will help island of Espiritu Santo to meet its increasing load demand and to reduce reliance on diesel power during the daytime and also aid prospective development in neighboring island Aore. The project is expected to bring in economic development in the region.</p>																
<b>PROJECT DESCRIPTION AND PROPOSED ACTIVITIES</b> <i>About ½ page</i>	<p>Wambu River (also known as Usa River) is located in the south west corner of the Espiritu Santo Island. A mini hydropower scheme has been proposed as part of the Technical Assistance for promoting assess to renewable energy in the Pacific. Under the Technical Assistance ADB will fund only the initial technical/feasibility study of the project. The river for the hydropower station has been selected by the Energy Unit of the Ministry of Land. The proposed Wambu River Mini Hydro Scheme is located West of provincial capital Luganville in Santo Island.</p> <p>A site assessment of proposed hydropower project was conducted in April 2011. The information gathered during the site assessment was supplemented with aerial photography interpretation, geology maps and the booklet Geology of South Santo. The aim of the aerial interpretation was to identify geological and geotechnical risk that could not be seen on site, such as fault/fracture systems, landslide risks, possible area constraints for the canal route,etc.</p> <p>The proposed project will have an estimated power generating capacity of 4 MW and equivalent annual energy production of 18.35 GWh.</p> <p>The project will be implemented over a period of three years inclusive of detailed design, procurement and construction activities. The project is expected to be commissioned by 2015. The estimated total project cost is US\$54.41 million. The costs of environmental protection, environmental monitoring, and land acquisition and use are not included in the estimated total project cost.</p>																
<b>TECHNOLOGY TO BE EMPLOYED<sup>1</sup></b> <i>Describe in not more than 5 lines</i>	<p>The salient features for the selected project size of 4000 KW are:</p> <table border="1" data-bbox="557 1444 1489 1703"> <thead> <tr> <th>Description</th> <th>Parameters</th> </tr> </thead> <tbody> <tr> <td>Type of Power Plant</td> <td>Run –of-the-river</td> </tr> <tr> <td>Installed Capacity</td> <td>4 MW</td> </tr> <tr> <td>Catchment Area at intake site</td> <td>84km<sup>2</sup></td> </tr> <tr> <td>Gross Head</td> <td>82.5m</td> </tr> <tr> <td>Design Flow</td> <td>1.33m<sup>3</sup>/s(@18% flow)</td> </tr> <tr> <td>Turbines</td> <td>Francis, two units</td> </tr> <tr> <td>Generators</td> <td>4 MW, AC</td> </tr> </tbody> </table> <p>A transmission line of 20KV for a distance up to 15 Km is envisaged in the pre-feasibility study.</p>	Description	Parameters	Type of Power Plant	Run –of-the-river	Installed Capacity	4 MW	Catchment Area at intake site	84km <sup>2</sup>	Gross Head	82.5m	Design Flow	1.33m <sup>3</sup> /s(@18% flow)	Turbines	Francis, two units	Generators	4 MW, AC
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<sup>1</sup> Please note that support can only be provided to projects that employ commercially available technology. It would be useful to provide a few examples of where the proposed technology has been employed.

<b>TYPE OF PROJECT</b>	
Greenhouse gases targeted CO <sub>2</sub> /CH <sub>4</sub> /N <sub>2</sub> O/HFCs/PFCs/SF <sub>6</sub> <i>(mention what is applicable)</i>	CO <sub>2</sub>
Type of activities Abatement/CO <sub>2</sub> sequestration	Abatement
Field of activities <i>(mention what is applicable)</i> See annex 1 for examples	Renewable Energy – Mini Hydro Power (1 e)
<b>LOCATION OF THE PROJECT</b>	
Country	The Republic of Vanuatu
City	Espiritu Santo Island
Brief description of the location of the project <i>No more than 3-5 lines</i>	The project is to be located in Wambu River. The project coordinates are: Intake Coordinates: S16 ° 04' 40" / E167 ° 16' 47" Powerhouse Coordinates: S16 ° 05' 34" / E167° 16' 31"
<b>PROJECT PARTICIPANT</b>	
Name of the Project Participant	Department of Energy under the Ministry of Lands and Natural Resources (MLNR)
Role of the Project Participant	b.Owner of the site or project
Organizational category	a. Government
Contact person	Leo Moli / Benjamin Jesse
Address	Department of Energy, PMB 9067, Port Vila, Vanuatu
Telephone/Fax	+678 25201/+678 5333840
E-mail and web address, if any	<a href="mailto:lmoli@vanuatu.com.vu">lmoli@vanuatu.com.vu</a> , <a href="mailto:benjaminjes@gmail.com">benjaminjes@gmail.com</a>
Main activities <i>Describe in not more than 5 lines</i>	The Ministry of Lands and Natural Resources oversees the functions of the Department of Lands, the Department of Geology, Mines and Water, the Department of Environment and Conservation and the Energy Unit. It also works in collaboration with other Ministries, such as the Ministry of Internal Affairs through the Port Vila Municipal Council, to deal with land issues.
Summary of the financials <i>Summarize the financials (total assets, revenues, profit, etc.) in not more than 5 lines</i>	Not Applicable as Government Entity.
Summary of the relevant experience of the Project Participant <i>Describe in not more than 5 lines</i>	Not Applicable as Government Entity.
<b>EXPECTED SCHEDULE</b>	
Earliest project start date <i>Year in which the plant/project activity will be operational</i>	2015
Expected first year of CER/ERU/VERs delivery	2016
Project lifetime <i>Number of years</i>	30 years
For CDM projects: Expected Crediting Period <i>7 years twice renewable or 10 years fixed</i>  For JI projects:	7 years twice renewable

Period within which ERUs are to be earned ( <i>up to and including 2012</i> )	
Current status or phase of the project <i>Identification and pre-selection phase/opportunity study finished/pre-feasibility study finished/feasibility study finished/negotiations phase/contracting phase etc. (mention what is applicable and indicate the documentation)</i>	The pre-feasibility study is finished.  Available document: <b>Interim Report : Promoting Access to Renewable energy in the Pacific</b> Snowy Mountains Engineering Corporation (SMEC) has prepared this report as the third deliverable under the Contract for Consultancy Services COSO/41-550 signed on 2 November 2010, for consulting services of ADB TA 7329-REG: Promoting Access to Renewable Energy in the Pacific (the Project)
Current status of acceptance of the Host Country <i>Letter of No Objection/Endorsement is available; Letter of No Objection/Endorsement is under discussion or available; Letter of Approval is under discussion or available (mention what is applicable)</i>	The DNA Guidelines has been finalized and approved by National Advisory Committee on Climate Change (NACCC). The draft Cabinet paper for approval by Council of Ministers (CoM) is under circulation for comments. It is expected that the approval by CoM will be completed before June 2012.
The position of the Host Country with regard to the Kyoto Protocol	Has the Host Country ratified/acceded to the Kyoto Protocol? <u>Yes, 2001</u>  Has the Host Country established a CDM Designated National Authority / JI Designated Focal Point?  <u>In the process of establishing DNA to be completed by June 2012.</u>

## B. METHODOLOGY AND ADDITIONALITY

<b>ESTIMATE OF GREENHOUSE GASES ABATED/ CO<sub>2</sub> SEQUESTERED</b> <i>In metric tons of CO<sub>2</sub>-equivalent, please attach calculations</i>	Annual (if varies annually, provide schedule):11,569 tCO <sub>2</sub> -equivalent Up to and including 2012: 0 tCO <sub>2</sub> -equivalent Up to a period of 10 years: - tCO <sub>2</sub> -equivalent Up to a period of 7 years: 80,983 tCO <sub>2</sub> -equivalent  <table border="1" data-bbox="750 1409 1300 1696"> <thead> <tr> <th>Year</th> <th>Emission Reduction (tCO<sub>2e</sub>)</th> </tr> </thead> <tbody> <tr> <td>2016</td> <td>11,569</td> </tr> <tr> <td>2017</td> <td>11,569</td> </tr> <tr> <td>2018</td> <td>11,569</td> </tr> <tr> <td>2019</td> <td>11,569</td> </tr> <tr> <td>2020</td> <td>11,569</td> </tr> <tr> <td>2021</td> <td>11,569</td> </tr> <tr> <td>2022</td> <td>11,569</td> </tr> </tbody> </table>	Year	Emission Reduction (tCO <sub>2e</sub> )	2016	11,569	2017	11,569	2018	11,569	2019	11,569	2020	11,569	2021	11,569	2022	11,569
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<b>BASELINE SCENARIO</b> CDM/JI projects must result in GHG emissions being lower than “business-as-usual” in the Host Country. At the PIN stage questions to be answered are at	CO <sub>2</sub> is the targeted emission reductions by the project activity.  Like other small economy countries in the Pacific Islands, Vanuatu relies on imported fuels for transportation and electricity production. Vanuatu also faces challenges in the development of the energy sector to cater the increasing trend of power demand and increased fuel importation. Vanuatu’s grid power supply																

<p>least:</p> <ul style="list-style-type: none"> <li>• Which emissions are being reduced by the proposed CDM/JI project?</li> <li>• What would the future look like without the proposed CDM/JI project?</li> </ul> <p>About ¼ - ½ page</p>	<p>in Port Vila is considerably being operated at a high reliability level but other islands such as Santo, Malekula and Tanna are not up to par. Old and inefficient diesel generator sets are still used in these islands, requiring high maintenance and consuming more imported fossil fuel.</p> <p>The island of Santo requires additional power supply to cater the increasing load demands and also to reduce its dependency on petroleum fuel based electricity generator.</p> <p>At present only town of Luganville is supplied with grid connected electricity while the rest of the island remains virtually un-electrified. The grid electricity is supplied by Vanuatu Utilities and Infrastructure, Ltd (VUI). VUI provides the power within a radius of 15 km concession. The electricity comes from a diesel power generator based in Luganville and from Sarakata Hydro Power Station.</p> <p>The levelized cost of energy from the proposed project is US\$0.29 per kWh, which is slightly lower than VUI's benchmarked marginal cost of US\$0.30 per kWh for any alternative power supply to Luganville grid.</p> <p>In the absence of this proposed project, the baseline scenario would be continued usage of diesel based electricity generation with very high operational costs due to high costs of diesel.</p>
<p><b>ADDITIONALITY</b> Please explain which additionality arguments apply to the project:</p> <ul style="list-style-type: none"> <li>(i) there is no regulation or incentive scheme in place covering the project</li> <li>(ii) the project is financially weak or not the least cost option</li> <li>(iii) country risk, new technology for country, other barriers</li> <li>(iv) other</li> </ul>	<p>Project additionally can be demonstrated as per "Guidelines for Demonstrating Additionality of Micro-Scale Project Activities" EB 63 (version 03)".</p> <p>As per the paragraph 2 of the guidelines:</p> <p>Project activities up to 5 MW that employ renewable energy technology are additional if any one of the below conditions are satisfied:</p> <ul style="list-style-type: none"> <li>a) The geographic location of the project activity is in LDCs/SIDs or in a special underdeveloped zone of the host country identified by the Government before 28 May 2010;</li> <li>b) The project activity is an off-grid activity supplying energy to households/communities (less than 12 hours grid availability per 24 hours day is also considered as off grid. for this assessment);</li> <li>c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;             <ul style="list-style-type: none"> <li>(i) Each of the independent subsystem/measure in the project activity is smaller than or equal to 1500 kW electrical installed capacity;</li> <li>(ii) End users of the subsystem or measure are households/communities/ Small and Medium-sized Enterprises (SMEs).</li> </ul> </li> <li>d) The project activity employs specific renewable energy technologies/measures recommended by the host country DNA and approved by the Board to be additional in the host country (conditions apply: The total installed capacity of technology/measure contributes less than or equal to 5% to national annual electricity generation).</li> </ul> <p>According to the United Nations, Vanuatu is classified both as a Least</p>

	<p>Developed Country (LDC) and Small Island Developing State (SIDS)<sup>2</sup>. Hence proposed project, which is having installed capacity of 5 MW is considered to be automatically additional as per the above EB guidelines.</p> <p>In addition, potential barrier analysis in terms of prevailing practice barrier and technological barriers (availability of skilled labour, capacity for O&amp;M etc) can also be explored.</p> <p>The project activity can also assist in terms of promoting development of hydropower plants in Vanuatu and to adopt more sustainable practices and in turn seeking carbon finance.</p>
<p><b>SECTOR BACKGROUND</b> Please describe the laws, regulations, policies and strategies of the Host Country that are of central relevance to the proposed project, as well as any other major trends in the relevant sector.</p> <p>Please in particular explain if the project is running under a public incentive scheme (e.g. preferential tariffs, grants, Official Development Assistance) or is required by law. If the project is already in operation, please describe if CDM/JI revenues were considered in project planning.</p>	<p>An estimated 27% of the Vanuatu population has access to electricity. Access rates in the main urban centers of Port Vila and Luganville are high at about 75%, dropping off considerably in rural areas. Power is supplied to the main urban areas of Port Vila, Luganville, East Malekula and Tanna under a concession arrangement to a private power company UNELCO (subsidiary of the SUEZ group).</p> <p>Vanuatu's grid power supply in Port Vila is considerably being operated at a high reliability level but other islands such as Santo, Malekula and Tanna are not up to par. The power supply is mainly dominated by diesel based generation.</p> <p>There is potential for increasing the electricity access rate in both urban and rural areas as well make electricity affordable. The electricity tariff charged to consumers across Vanuatu is the highest (up-to US\$ 0.65/kWh) in the Pacific Island Countries. Vanuatu does not have indigenous sources of fossil fuels, and the import of diesel for power generation has a high cost to the economy. However, there are significant indigenous resources which are being increasingly utilized and hydropower generation is one of them.</p> <p>Santo is the largest island of the Republic of Vanuatu and is situated in the northern side of the country. It has a total land area of 4,010 km<sup>2</sup> with the population of about 35,000. It is located in Sanma Province and has the second largest town in Vanuatu after Port Villa which is Luganville. Santo's number of households increased from 5938 (1999) to 7865 (2009), or an average annual growth rate of 2.85%. The town of Luganville holds the most of the population of this island and rest of the population is scattered in small villages around the island.</p> <p>The economic activities around the Island are mainly rural type where agriculture dominates some small scale activities such as fishery, forestry and animal husbandry.</p> <p>At present the town of Luganville is supplied with grid connected electricity while the rest of the island remains virtually un-electrified. The grid electricity is supplied by Vanuatu Utilities and Infrastructure Ltd (VUI). VUI provides the power within a radius of 15 km concession. The electricity comes from a diesel power generator based on Luganville and from the Sarakata Hydro Power Station.</p> <p>The share of hydro power is currently very low in Vanuatu. The only known hydro project is the 1.2 MW Sarakata River Hydroelectric Power Station which was developed under the Grant Aid provided by Government of Japan.</p>

<sup>2</sup> <http://www.un.org/special-rep/ohrlls/sid/list.htm>

<p><b>METHODOLOGY</b> Please choose from the following options:</p> <p>For CDM projects:</p> <p>(i) project is covered by an existing Approved CDM Methodology or Approved CDM Small-Scale Methodology</p> <p>(iii) projects needs modification of existing Approved CDM Methodology</p>	<p>The projects under this programme fall under the scope of following methodology <sup>3</sup></p> <p><i>Type:</i> I. Renewable energy projects <i>Category:</i> I.F<sup>4</sup> – Grid connected renewable electricity generation (Version 02 ,EB 61)</p> <p>Scope Number: 01</p> <p>The project will replace diesel based power generation in the region.</p>
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### C. FINANCE

<b>TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)</b>													
<p>Total project costs</p>	<p>Based on the pre-feasibility study the cost estimates for the indentified projects are as below</p> <table border="1" data-bbox="589 850 1308 1041"> <thead> <tr> <th>Item</th> <th>Total</th> <th>%</th> </tr> </thead> <tbody> <tr> <td>Capital Expenditure</td> <td>52,862,199</td> <td>97%</td> </tr> <tr> <td>Financing Charges During Development</td> <td>1,554,498</td> <td>3%</td> </tr> <tr> <td>Total Project requirements</td> <td>54,416,688</td> <td>100%</td> </tr> </tbody> </table> <p>The cost of land acquisition and resettlement (if any) and environmental protection and mitigation during construction are not included in the total project cost.</p>	Item	Total	%	Capital Expenditure	52,862,199	97%	Financing Charges During Development	1,554,498	3%	Total Project requirements	54,416,688	100%
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<b>SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED</b>													
<p>Equity Name of the organizations, status of financing agreements and finance (in US\$ million)</p>	<p>US \$ 16.325 million</p>												
<p>Debt – Long-term Name of the organizations, status of financing agreements and finance (in US\$ million)</p>	<p>ADB's Asian Development Fund (ADF) Proposed ADB loan US \$ 38.09 million</p>												
<p><b>SOURCES OF CARBON FINANCE</b> Name of carbon financiers that you are contacting (if any)</p>	<p>NA</p>												
<p><b>INDICATIVE CER/ERU/VER PRICE PER tCO<sub>2e</sub></b> <i>Price is subject to negotiation. Please indicate VER or CER preference if known.</i></p>	<p>US\$ 8 – 10 (Indicative price range only)</p>												

<sup>3</sup> Appropriate methodology - I.A/I.F for the project will be decided during PDD preparation once further information is available.

<sup>4</sup> [http://cdm.unfccc.int/filestorage/4/1/J/41JF08WD9MSEB5YLHTZ6KVAPUC7XNQ/EB61\\_repan18\\_Revision\\_%20AMS-I.F\\_ver02.pdf?t=cGJ8bTI5MGJkfDDQFZQOrj20lvbehi1G-28x](http://cdm.unfccc.int/filestorage/4/1/J/41JF08WD9MSEB5YLHTZ6KVAPUC7XNQ/EB61_repan18_Revision_%20AMS-I.F_ver02.pdf?t=cGJ8bTI5MGJkfDDQFZQOrj20lvbehi1G-28x)

<b>TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE</b>	
A period until 2012 (end of the first commitment period)	-
A period of 10 years	US\$ 647,864 – US\$809,830
A period of 7 years	

#### **D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS**

<p><b>LOCAL BENEFITS</b> E.g. impacts on local air, water and other pollution.</p>	<p>The environmental impacts of a typical project related to construction activities may include: water pollution; air and noise pollution; increased waste; soil erosion; destruction of vegetation; risk to wildlife; damage to cultural property etc; environmental issues associated with construction camp housekeeping. The potential impacts on the local populations during construction may be significant due to proximity of the works to settlements.</p> <p>A detailed Environment Impact Analysis (EIA) for the project will be carried out in accordance with The Environmental Protection and Conservation Act No. 12 of 2002 (amended in 2010) and appropriate mitigation measures is planned to be developed through the EIA and the Environmental Management Plan (EMP)</p>
<p><b>SOCIO-ECONOMIC ASPECTS</b></p>	
<p>What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project? Indicate the communities and the number of people that will benefit from this project. <i>About ¼ page</i></p>	<p>The project will provide more economical and reliable power supply to meet the Santo Island power demand. The project will also reduce demand for imported fuels through renewable energy resources, especially in the rural areas. Hydropower will offset a proportion of the diesel currently used, and so reduce the overall cost of generation. The project will lead to increase in electricity supply in the island which will benefit the local industry and local community. There may be additional, indirect, benefits that result from the increased supply of electricity and hence economic activity in the region.</p>
<p>What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? <i>About ¼ page</i></p>	<ul style="list-style-type: none"> <li>• Jobs, training and income generation during construction and operation through direct employment.</li> <li>• Income generation through monetized compensation payments.</li> <li>• Compensatory benefit through improved services and infrastructure and support of livelihoods programmes. Benefit sharing schemes may provide the best opportunity to provide a positive impact to the entire community including vulnerable groups.</li> <li>• Access to electricity.</li> <li>• Income generation opportunities generated from increased human activity in the area.</li> <li>• Overall poverty reduction and improvement in living standards.</li> </ul>
<p><b>ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST COUNTRY</b> A brief description of the project's consistency with the environmental strategy and priorities of the Host Country <i>About ¼ page</i></p>	<p>The proposed project activity is consistent with environmental strategy and priorities of the host country. Any developmental project in Vanuatu should meet the criteria's set out in Government of Republic of Vanuatu, Priority and Action Agenda 2006-2015 and Planning Long, Acting Short agenda (2009-2012). For environment conservation the two document set out following policy priorities for Government of Vanuatu :</p> <p><i>"Equitable and Sustainable development of land while ensuring the heritage of future generation". A key performance indicator for implementation of this policy is "Environment Impact Assessment (EIA) should be conducted for all development related projects".</i></p> <p><i>"Promote sound and sustainable environmental management practices; Implement the Environmental Protection and Conservation Act and the</i></p>



	<p><i>regulation of related activities"</i></p> <p>The project activity meets the above criteria's as a detailed Environment Impact Analysis (EIA) for the project will be carried out in accordance with The Environmental Protection and Conservation Act No. 12 of 2002 (amended in 2010) and appropriate mitigation measures are planned to be developed through the EIA and the Environmental Management Plan (EMP).</p> <p>Project activity is renewable energy based power generation which will help country to make a transition from the traditional energy supply source to the renewable energy sources. Hence, the project activity is also in line with country's Renewable Energy Policy Framework wherein goal is to increase renewable energy use in Vanuatu.</p> <p>The project activity is a run-of-river hydroelectric power plant. It is a well-established technology which utilizes water for energy generation without depleting it or impacting the natural environment. Since the project activity generates electricity from renewable source, it avoids emission such as SO<sub>x</sub> , NO<sub>x</sub> and other particulates matter which would have been emitted from the fossil fuel fired plants.</p>
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## ANNEX I - Technologies

1. Renewables
  - 1a. Biomass
  - 1b. Biogas
  - 1c. Bagasse
  - 1d. Wind
  - 1e. Hydro
  - 1f. Geothermal
  - 1g. Photovoltaic
  - 1h. Solar Thermal
2. Fossil Fuel Switch
3. Energy Efficiency
  - 3a. Cement Efficiency Improvement
  - 3b. Construction material
  - 3c. District heating
  - 3d. Steel Gas Recovery
  - 3e. Other Energy Efficiency
4. Waste Management
  - 4a. Landfill Gas recovery/utilization
  - 4b. Composting
  - 4c. Recycling
  - 4d. Biodigestor
  - 4e. Wastewater Management
5. Coalmine/Coalbed Methane
6. Oil and Gas Sector
  - 6a. Flared Gas Reduction
  - 6b. Reduction of technical losses in distribution system
7. N<sub>2</sub>O removal
8. HFC23 Destruction
9. SF<sub>6</sub> Recovery
10. Transportation
  - 9a. Fuel switch
  - 9b. Modal switch
11. Others