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Report No: 30770-PH

PROJECT APPRAISAL DOCUMENT

ON THE PURCHASE OF EMISSION REDUCTIONS

PROPOSED BY THE PROTOTYPE CARBON FUND

IN THE AMOUNT OF USD 1.5 MILLION

TO THE

NORTHWIND POWER DEVELOPMENT CORPORATION

FOR A

NORTHWIND BANGUI BAY PROJECT

December 8, 2004

Energy and Ming Sector Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 29, 2004)

Currency Unit	=	Philippine Peso (P)
P1	=	US$0.0177
US$1	=	P 56.27

FISCAL YEAR
January 1 - December 31

ABBREVIATIONS AND ACRONYMS

CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
DANIDA	Danish International Development Agency
DOE	Department of Energy
EPIRA	Electric Power Industry Reform Act
ERPA	Emission Reductions Purchase Agreement
ESA	Electricity Sales Agreement
INEC	Ilocos Norte Electric Cooperative
GHG	greenhouse gas
GOP	Government of the Philippines
MP	Monitoring Plan
NEA	National Electrification Administration
NPC	National Power Corporation
NWPDC	Northwind Power Development Corporation
PCF	Prototype Carbon Fund
tCO_2e	tons of carbon dioxide equivalent
UNFCCC	UN Framework Convention on Climate Change

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NorthWind Bangui Bay Project

PROJECT APPRAISAL DOCUMENT

East Asia and Pacific Region
Energy and Mining Sector Unit

Prototype Carbon Fund

Date: December 1, 2004 Country Director: Joachim von Amsberg Sector Manager: Junhui Wu Project ID: P087464 Instrument: Emission Reductions Purchase	Team Leader: Selina Shum Sectors: Energy Themes: Infrastructure services for private sector development, Rural services and infrastructure, environmental policies and institutions

Project Financing Data

[ ] Loan [ ] Credit [ ] Grant [ ] Guarantee [x] Other: Prototype Carbon Fund
For Loans/Credits/Others
Total Project Cost (US$m.): 35.4 Cofinancing: 35.4
Total Bank Financing (US$m.): $0
Proposed terms: yearly payments until 2014

Financing Plan (US$m.)

Source	Local	Foreign	Total
Private Investors	1.0	3.7	4.7
IBRD/IDA			
Others			
Danish International Development Agency (DANIDA)		30.8	30.8

Borrower: Not applicable
Responsible Agency: NorthWind Power Development Corporation (NWPDC)

Estimated disbursements (Bank FY/US$m): N/A

FY					
Annual					
Cumulative					

Project implementation period: 2005-2014
Expected effectiveness date: January 2005
Expected closing date: December 2014

Does the project depart from the CAS in content or other significant respects? ***Ref. PAD A.3***	☐ Yes X No
Does the project require any exceptions from Bank policies? N/A Have these been approved by Bank management? Is approval for any policy exception sought from the Board?	☐ Yes ☐: No ☐ Yes ☐ No ☐ Yes X No

Does the project include any critical risks rated "substantial" or "high"? ***Ref. PAD C.5***	☐ Yes X No
Does the project meet the Regional criteria for readiness for implementation? N/A	☐ Yes ☐ No

Project development objective ***Ref. PAD B.2.***

This Project will contribute to the country's development objectives of sustainable economic development through the enhancement of both quantity and reliability of power supply in an environmentally responsible manner. The Project will also contribute towards the global environment objective of reducing greenhouse gas emissions through the avoidance of thermal power generation.

Project description ***Ref. PAD B.3.***

This wind farm project will comprise (a) fifteen wind turbines, with a total capacity of 24.75 MW and annual energy production is estimated to be about 74.48 GWh; and (b) construction of a 50 km 69kV overhead transmission line to deliver the power to Ilocos Norte Electric Cooperative (INEC) which has the exclusive franchise to distribute electricity in the area. The PCF will purchase ERs, targeted annually at 35,600 tons of Carbon Dioxide equivalent(tCO2e), for the first 10 years of the project operation at a price of US$4.25/tCO2e, totalling approximately $1.5 million.

Which safeguard policies are triggered, if any? ***Ref. PAD D.3, Technical Annex 10***

O.P. 4.01 – Environmental Assessment - see Annex 10

Significant, non-standard conditions, **if any**, for:

Board presentation: Not applicable

Loan/credit effectiveness: Not applicable

Covenants applicable to project implementation: Not applicable

A. STRATEGIC CONTEXT AND RATIONALE

1. Country and sector issues

Dependence on imported and polluting fossil fuels

The primary energy mix of the Philippines is characterized by a heavy dependence on largely imported fossil fuels which accounted for some 52 percent of the total energy supply in 2002. According to the Philippine Energy Plan (2004-2013), the share of fossil fuels is expected to increase, accounting for about 62% of the total energy supply in 2013. As a corollary for projected economic growth, demand for electricity is expected to increase from 48,467 GWh in 2002 to 111,210 GWh in 2013. Energy consumption by power generation is projected to increase from about 58 million barrels of fuel oil equivalent (MMBFOE) in 2002 to 70 MMBFOE in 2013. Coal-fired plants remain to be the dominant type of power generation in the country, accounting for 27% of the total power generation, while oil-based power generation accounted for some 14% of the total in 2003.

Energy security and environmental concerns

In the wake of global oil and coal price hike over the past year, the country's heavy dependence on imported oil and coal has become a top priority concern for the Government of the Philippines (GOP). Moreover, coal and oil-fired power plants are major sources of environmental concerns at both the local and global levels. The energy sector accounts for over 26% of the country's total greenhouse gas (GHG) emissions. Due to the projected increase in electricity demand, GHG emissions from the power sector is expected to increase from 14 million tons of carbon dioxide equivalent (tCO_2e) in 1996 to about 60 million tCO_2e in 2010 and 133 million tCO_2e in 2020 (under a business as usual scenario). The rural power sector contributes a disproportionately large amount to these emissions. This could be attributed to a number of factors, including (a) inefficiencies of many electric cooperatives and their lack of creditworthiness to tap investment financing to reduce high system loss; and (b) Philippines is a large archipelago comprising some 7,000 islands and, in remote islands and off-grid areas, electrification is characterized by a high dependence on diesel or bunker fuel for power generation, resulting in a higher carbon intensity than the Philippine energy sector as a whole. Given the GOP's current goal to increase *barangay* (village) electrification from the current level of about 90% to 100% by 2008, and the fact that all the unelectrified *barangays* are in rural areas, emissions of GHGs are likely to increase at a rapid pace under the status quo scenario.

Government Policy Response

- The Clean Air Act of 1999 aims to provide a comprehensive air pollution control policy for the country. The challenge, however, is in implementation.
- GOP ratified the UN Framework Convention on Climate Change (UNFCCC) in August 1994, and more recently, the Kyoto Protocol in October 2003. Its Climate Change Action Plan endorses a shift from the current fossil-dominated energy mix to one that involves greater use of renewable energy resources. The United Nations Development Programme/Asian Development Bank/Global Environment Facility (UNDP/ADB/GEF) Asia Least-Cost GHG Abatement

Strategy (ALGAS) report highlighted the crucial role of the energy sector in reducing GHG emissions and have identified the promotion of renewable energy (RE) as a strategic priority.

- Electric Power Industry Reform Act (EPIRA) of 2001 cited the State policy to promote the utilization of indigenous and new and renewable energy resources in power generation in order to reduce dependence on imported energy.
- GOP's commitment to policy and institutional reforms necessary to remove barriers for rural electrification and RE development has been articulated in its Letter of Sector Development Program (dated March 2003) under the Bank/GEF-financed Rural Power Project.
- In 2004 energy independence has been declared as one of the five major reform agenda of the President of the Philippines. Towards this end, the action plan of the Department of Energy (DOE) includes, among others, (a) diversification of the energy mix to increase the reliability and security of energy supply, notably through aggressive development of RE; and (b) promotion of energy conservation, including the recent introduction of time-of-use power tariff.
- The RE Policy Framework issued by DOE sets ambitious targets for doubling the current level of renewable-energy-based power generation capacity by 2013 and to become the number one wind energy producer in Southeast Asia. This high scenario is based on the following key assumptions: (a) enhancement of existing policies and programs to establish a market-driven RE industry that is conducive to private sector investment and participation and encourages technology transfer and research and development; and (b) availability of international financing schemes (e.g., Clean Development Mechanism or CDM).

2. Rationale for PCF involvement

The wind power generated under the Project displaces highly polluting diesel-based power generation at the margin, thereby reducing emissions of GHG and other air pollutants. Reducing such emissions to the atmosphere from human activity, such as the operation of fossil-fueled power plants, is one of the key approaches to combating climate change. The Prototype Carbon Fund (PCF) was created to pioneer emission reductions purchase transactions while opening up a significant new source of financing for projects in developing countries. PCF supports projects that generate high quality Certified Emission Reductions (CERs) suitable for registration with the UNFCCC as meeting targets for the Kyoto Protocol.

3. Higher level objectives to which the project contributes

The Project is located in the remote, northern tip of the Luzon grid which is plagued by expensive but unreliable power supply. This is mainly due to the long-distance transmission of power from plants mostly located in the southern corridor of Metro Manila. Coal-fired power plants currently account for 32% of the total installed capacity in Luzon, while oil-based power plants comprise 24% of the capacity mix. In the short term, the overall Luzon grid is characterized by surplus power generation; this Project and another wind farm project (40MW) in Ilocos Norte are the only two new plants committed thus far for Luzon. Based on DOE's projection, power demand will exceed supply from the existing and committed plants by 2008. This Project will enhance both the quantity and reliability of power supply in the region through the insertion of power at the end of a long power transmission line where voltages are now weak. Moreover, as the first wind farm project in the Philippines, the Project will have a significant demonstration effect in accelerating the commercialization of wind power, thereby contributing to GOP's goal for reducing the country's

dependence on imported energy and broadening its resource base with an indigenous, inexhaustible and environmentally desirable option.

This private sector-sponsored project is fully consistent with the Country Assistance Strategy (CAS) that includes improving rural infrastructure services for economic growth, strengthening private sector participation and enhancing environmentally sustainable development. This Project has been endorsed by the government for carbon financing, as it will contribute to the energy sector's goal of expanding the use of indigenous energy resources and reducing the country's heavy reliance on imported fossil fuels.

B. PROJECT DESCRIPTION

1. Instrument

The Project sponsor is a local private company, Northwind Power Development Corporation (NWPDC). PCF will purchase partial or entire CERs upon the operation of this Project for ten years. The Emission Reductions Purchase Agreement (ERPA), recently negotiated between NWPDC and the Bank (acting as trustee for PCF), provides for a price of $4.25 per tCO_2e and target annual CERs of 35,600 tCO_2e. The exact amount of CERs eligible for purchase is determined by a Baseline Study and by independent verification of actual energy output each year after plant commissioning.

2. Project development objective and key indicators

This Project will contribute to the country's development objectives of sustainable economic development through the enhancement of both quantity and reliability of power supply in an environmentally sustainable manner. The Project will also contribute towards the global environment objective of reducing greenhouse gas emissions through the avoidance of thermal power generation. The key Project performance indicators will include (a) the quantity and cost of electricity generation/sales; and (b) actual CERs.

3. Project components

The Project is located in the foreshore of Bangui Bay in Ilocos Norte Province. The wind farm project, with total cost of US$35.45 million, will comprise: (a) fifteen wind turbines of 1,650 kW rated capacity each, totaling 24.75 MW. Annual energy production is estimated to be about 74.48 GWh at a capacity factor of 34%; and (b) construction of a 50 km 69kV overhead transmission line to deliver the power to the switchyard of the offtaker, in Laoag City. The Engineering and Procurement Contract (EPC) of about $31 million for a turnkey installation of power plant, substation and transmission line has been awarded to NEG Micon. Considering the wind farm costs alone, the installed cost is about $1,186 per kW. Counting all project costs, the installed cost is about $1,400 per kW. This is still in the middle of the cost range of recent experience for 25 MW-scale wind projects. All power produced will be sold to the Ilocos Norte Electric Cooperative (INEC) through an Electricity Sales Agreement (ESA) signed in 2002. INEC has the exclusive franchise to distribute electricity in the area.

4. Lessons learned and reflected in the project design

The project technical design represents the most advanced developments in wind technology and the results of decades of operational experience by Danish companies. Some of the lessons learned from past wind projects that were reflected in the present design include: a) the need for an adequate period of wind energy measurements at the site, b) the need to ensure minimal grid interconnection impacts, c) adequate consideration for the violent typhoons that are frequent in the country, and d) the need for long-term power purchase contracts to assure project sustainability. At least two years of wind data collection with anemometers and modern data logger equipment preceded the project design. A detailed system impact study for the INEC/Transco grid was carried out by the national transmission company which confirmed that the wind farm could be readily connected to the grid with only a minimal amount of capacitative compensation needed. The NM82 turbine that was chosen has a survival wind speed of 70 m/s, well in excess of the maximum 44 m/s recorded with typhoons in the area during the two years of wind measurement. The 20 year ESA with INEC minimizes the market risk of the Project. Lessons learned from earlier CF projects have been incorporated in the Bank's due diligence work, as well, including: a) the need to pay special attention to the implications of overall power sector restructuring and renewable energy policy on the Project, and b) the need to carefully assess the creditworthiness of the offtaker and its long term ability to purchase power from the Project.

5. Alternatives considered and reasons for rejection

An alternative to this Project is to maintain status quo of power supply by the National Power Corporation (NPC) that has been dominated by imported and polluting fossil fueled power generation. This alternative has been rejected for the following reasons: (a) the shift from fossil fueled power generation to renewable forms of energy is a key strategy of the GOP to increase the energy security of the country while minimizing the environmental impact of power generation; (b) the shift from public sector to private sector financing of power generation and transmission is a compelling response to the serious fiscal deficits of the country and provides the potential for operational efficiency gains by private sector management; and (c) the Project, by design, represents a lower cost alternative to the traditional supply of power by NPC This will be translated into lower end-user price in the Project area as the price of wind power to be sold to INEC will be lower than that of NPC. Indeed, the Project was selected as the first PCF project in the Philippines because of its sound project design, its readiness to commence operation in 2005 and the commitment of the Project sponsor, private investors and provincial government in forging an effective public/private partnership which is crucial to advance RE development in the country.

C. IMPLEMENTATION

1. Institutional and Implementation arrangements

The Project will be implemented in accordance with the ERPA signed between NWPDC and the Bank, as trustee of the PCF. A Monitoring Plan (MP) has been agreed between parties to the ERPA. The ERPA and MP define the quantity, price and other delivery conditions for ERs to be purchased by PCF as well as monitoring and verification systems and methods. Eligibility of ERs for purchase by PCF will be verified by an independent third party. Verification and certification of ERs generated annually by the Project will be coordinated by the PCF which will ultimately

purchase the ERs. As per the requirement of the Kyoto Protocol, GOP will operate a registry to manage the transfer of ERs generated by the project.

NWPDC, the Project sponsor, will be responsible for implementation of the Project, including the following provisions under the ERPA:

- Maintain and operate the Project in accordance with sound business practices, proper due diligence and high efficiency;

- Undertake all reasonable efforts, including project documentation, to ensure eligibility of ERs under Art.12 of the Kyoto Protocol;

- Undertake, satisfactory to the Bank, actions agreed in the Environmental Management Plan (EMP) to comply with the Bank's safeguard policies; and

- Notify the Bank of anything that may have an impact on the project or its capacity to deliver ERs, including delays, material adverse changes and force majeure.

Specifically, in relation to ER, NWPDC will:

- Monitor the emissions and other relevant parameters;

- Organize periodic auditing of the project and verification that emission reductions have been achieved in compliance with relevant project criteria, including the preparation of required reports;

- Prepare a brief annual or biannual report that should include: information on overall project performance, emission reductions generated and verified and comparison with targets, observations regarding MP baseline scenario indicators, information on adjustment of key MP assumptions, and calculation methods and other amendments of the MP; and

- Ensure certification of verified emission reductions.

Payment and flow of funds. The timing of the first payment will occur upon certification by the PCF that all the relevant conditions provided under the ERPA have been met. Thereafter, the PCF will only disburse against delivery of verified and certified ERs. The involvement of the PCF with the project will expire after CERs up to the total contract amount have been delivered. In the event that the project sponsors fail to deliver the quantity of CERs for any given calendar year as set forth in the ERPA, they will be required to make-up the shortfall over the course of the following calendar year or other period agreed upon..

2. Monitoring and evaluation of outcomes/results

Carbon finance projects are initially evaluated on the basis of an ex-ante analysis of the emissions baseline (conventional generation and emissions that would have occurred in the absence of the project) and determination of project additionality. Project performance - and payment for CERs –

is then monitored in accordance with the requirements of the MP incorporated in the schedule of the ERPA and evaluated on the basis of achieving the expected CERs. Monitoring and evaluation of CERs is implicit in the project as a function of electricity generation as it occurs, with payment based on Megawatt hours (MWh) of generation as invoiced to the customer purchasing the electricity.

To increase the likelihood that CERs acquired under the ERPA will satisfy the requirements of the UNFCCC and the Kyoto Protocol, PCF will retain the services of internationally-recognized, fully independent third parties to: a) provide validation of the sector-wide Baseline; b) provide validation of the project design, the project specific Baseline Study (test of additionality against the sector-wide baseline), and the MP. This independent third party will also undertake periodic verification and certification of the ER generated by each project and issue a Verification and Certification Report that includes:

- A statement of the amount of verified and CERs the projects have generated in the relevant period,
- Other matters as may be required by the UNFCCC or Kyoto Protocol, and
- Verification of compliance with Bank Safeguard Policies.

The validator will present a Project Design Document (initial PDD in Annex 13), along with a description of the methodology chosen to measure the ERs and to demonstrate additionality, to the Executive Board of CDM, for its approval and registry under international rules. This approach ensures the creation of an environmental commodity that is recognized by existing laws of the Philippines and conforms in due course to the relevant international agreements. It is understood that these international guidelines may change, according to decisions by the Conference of the Parties to the UNFCCC and Kyoto Protocol. The project will be reviewed by the Bank during the construction phase of Project to address areas of implementation weaknesses, especially concerning the EMP, accommodate changes in priorities, and ensure compliance with relevant Bank policies and procedures.

3. Sustainability

The project sponsor is a private company whose principals have years of experience in power and energy systems and business development, and enjoys the support of the provincial government of Ilocos Norte. The main consultants for the technical design was the Danish firm, TRIPOD, that has over twenty years of experience in providing specialized wind energy engineering services to international clients. NEG Micon (NEGM), a highly reputable Danish firm, will construct the wind farm on turnkey basis, and operate and maintain it for the first five years, ensuring ample time to train NWPDC local personnel. The wind farm is thus expected to operate efficiently and continuously during the project life. Multiyear wind measurements conducted at the pre-investment stage maximizes the chances that projected annual wind energy production will be achieved. Purchase of generated electricity on “as-and-when-available” basis is guaranteed by a 20-year ESA with a single offtaker, INEC. The finances of INEC are expected to remain satisfactory, as elaborated in the financial analyses below.

4. Critical risks and possible controversial aspects

There are no controversial aspects foreseen in the project. Critical risks are described below:

Risks	Risk Mitigation Measures	Risk Rating with Mitigation
To project development objective		
Baseline risk	Baseline and monitoring methodologies used in the current projects have been approved by the CDM Executive Board.	M
Kyoto Protocol Risk	No mitigation possible. Failure for Kyoto to enter into force would terminate the carbon purchase obligation by the PCF; whether it would end purchases is not known ex-ante.	M
To component results		
Technicalrisk	Potential grid-integration risks, and turbine selection and layout risks are reduced by technical system design by reputable wind power consultants and grid impact study conducted by the transmission company.	M
Market risk	Regional electricity demand growth is 7.5% up to 2009. All power produced will be sold to INEC through an Electricity Sales Agreement (ESA) signed in 2002. INEC has the exclusive franchise to distribute electricity in the area.	M
Power Generation Price Risk	Power generation price will be deregulated upon the commercial operation of the Wholesale Electricity Spot Market (WESM) in 2006. While there are considerable uncertainties and volatility related to the price levels under WESM, the low operating costs of the windfarm project will allow it to remain financially viable as the WESM prices are expected to be based on higher-priced oil and gas-fired power generation at the margin.	S
Carbon Funds purchase risk	The World Bank will pay only for certified and verified delivery of CERs associated with power generation output of the project.	M
Off-taker Risk	The sponsor has already signed long-term ESA with the offtaker, INEC. The finances of INEC are projected to remain satisfactory.	M
Country Risks	Despite slower growth caused by spillover of Asian financial crisis, the Philippines economy has been fairly stable in the last few years.	M
Regulatory Risks	The new electricity industry reform law (2001) has opened up the sector to private participation and significantly improved the regulatory framework for power transmission tariff.	M
Wind regime risks	Multiyear wind energy measurements at pre-investment stage greatly improves probability of achieving projected annual energy production	M
Overall risk rating		**M**

5. Loan/credit conditions and covenants

Not applicable

D. APPRAISAL SUMMARY

1. Economic and financial analyses (see Annex 9)

a) Project Returns

The key variables that significantly impact the project economics and finances include the following:

- ***Power production*** – The Project is located in a region which is considered to have excellent wind resource potential. As elaborated under the technical aspects below, the project is reasonably expected to produce 74.48 GWh annually, representing a net capacity factor of 34%.
- ***Power Price*** – in accordance with the ESA, power price will be pegged at a 7% discount from the NPC rate until the expiry of the contract between NPC and INEC in December 2005, and thereafter, a 5% discount from INEC's alternative power supply. For purposes of the economic and financial analyses, the effective NPC tariff of P4.43 per kWh in 2004 is assumed for 2005, thereafter adjusted with projected local inflation rates and foreign exchange rates between Peso and US dollar. This is a conservative assumption as NPC tariff is expected to increase in 2005.
- ***Project cost*** – based on actual EPC contract price. Additional capital expenditures, assumed to be 10% of the EPC contract price, are assumed for year 2014.
- ***Project financing*** -- About 87% of the project funded by a mixed credit from the Danish International Development Agency (DANIDA), with a senior loan of $29.4 million and a subordinated loan of $1.4 million. This is contingent on the Project sponsor securing a loan guarantee by a government agency, Philippine EXIM Bank (Phil Exim). Part of the collateral requirements for Phil Exim to guarantee the loan is for the project sponsor to assign the carbon credits secured under the Project to Phil Exim.

The Project is well advance in construction and is expected to be fully operational by April 2005. The project returns under both the base case and the sensitivity analysis of a low scenario, with 20% lower gross revenues (from lower production and/or price), are summarized below.

	Base Case	Sensitivity Analysis: Gross revenues 20% lower
Economic Rate of Return (ERR)	13.2%	9.4%
ERR without carbon credits	12.9%	9.1%
Financial Rate of Return (FRR)	10.9%	7.3%
FRR without carbon credits	10.6%	7.0%
Return on Equity (ROE)	39.5%	23.1%
ROE without carbon credits	37.5%	21.5%

Both the economic rate of return (ERR) and financial rate of return (FRR) are satisfactory, estimated at about 13% and 11% (in real terms), respectively. The results of sensitivity analysis indicated that even under the low scenario, the FRR of 7.3% remains well above the weighted cost of capital of the private project entity, estimated at about 4.2% (with its debt financing cost of about 3% p.a. before tax and 1.6% p.a. after tax; and cost of equity assumed to be 20%). Insofar as the private investor is concerned, the key financial indicator is the after-tax return on equity (ROE), which is expected to be robust at 39.5% and 23.1% under the base case and low scenario, respectively. The carbon credits, estimated at about $151,300 per year, totaling about $1.5 million during the ten-year period (2005-2014), are not expected to have a significant impact on the FRR although they are critical as a credit enhancement to facilitate credit access for project financing.

b) Project Entity

NWPDC was incorporated in May 2000 and has been responsible for the development of this project. The principals of NWPDC have years of experience in power projects and project management. NWPDC's finances are expected to be satisfactory, with debt service coverage ratio (DSCR) projected to be at least 1.4 times under the base case, and at least 1.1 time under the low production scenario. Its financial highlights (2005-2008) are summarized below. Detailed assumptions and financial projections are in Annex 9.

INEC's Projected Financial Indicators (2004-2008)

Financial Year Ending December 31	2004	2005	2006	2007	2008
Energy Sales (MWh)	158,093	162,836	167,721	172,752	177,935
Energy Sales Growth (%)	8.6%	3.0%	3.0%	3.0%	3.0%
Average Operating Revenue (PHP/kWh)	5.58	5.69	5.91	6.13	6.35
Net Operating Revenues, PHP Mn	882	927	991	1,058	1,130
Operating Margin, PHP Mn	66	58	55	50	43
Operating Expenses, PHP Mn	780	824	890	959	1,033
Net Income (Loss), PHP Mn	68	60	59	55	49
Profit Margin (%)	8%	7%	6%	5%	4%
Tariff Increase (%)	14%	2%	4%	4%	4%
Cash available for debt service (PHP Mn)	132	104	101	112	110
Debt Service Coverage Ratio (times)	17.6	4.7	4.6	7.0	9.1
Operating Ratio (%)	88%	89%	90%	91%	91%

c) Power off-taker

INEC is among the top tier ECs that have been consistently rated A+ by the National Electrification Administration (NEA) in recent years. As a further testimony to its sound financial position, INEC

is a borrower of the Rural Electrification Financing Corporation (REFC), a private commercial funding vehicle that provides long-term commercial funding to financially sound ECs. Over the past three years, its DSCR has remained robust at no less than 2.7 times. Its future finances are projected to remain satisfactory, with projected DSCR of at least 4.6 times, reflecting the recent condonation of NEA loans as provided under the EPIRA. Projected financial highlights over the period 2001 to 2008 are summarized below. Actual financial highlights, along with key assumptions and projected cash flows are in Annex 9.

NWPDC's Financial Indicators (2005-2008)
(P Million)

Financial Year Ending December 31	2005	2006	2007	2008
Energy Sales (MWh)	54,743	72,990	72,990	72,990
Energy Sales Growth (%)	-	33.3%	0.0%	0.0%
Avg Operating Revenue (PHP/kWh)	4.3	4.6	4.8	5.7
Load factor (%)	34%	34%	34%	34%
Net Operating Revenues, PHP Mn	242	343	358	424
Net Operating Income, PHP Mn	125	223	239	304
Operating Expenses, PHP Mn	(17)	(21)	(21)	(21)
Net Income (Loss), PHP Mn	104	181	201	272
Profit Margin (%)	43%	53%	56%	64%
Tariff Increase (%)	4.3%	6.7%	4.5%	4.5%
Cashflow available for Debt service (PHP Mn)	187.09	306.31	335.22	392.05
Debt/Debt + Equity Ratio (%)	82%	73%	63%	52%
Debt Service Coverage Ratio (times)	1.8	1.4	1.5	1.8
Operating Ratio (%)	48%	35%	33%	28%

2. Technical

For utility-scale applications, wind power is one of the most mature renewable energy technologies of relevance to the Philippines where the wind resource is estimated to have a generation potential of 70,000 MW . Considering only those areas of good-to-excellent wind resource, there are 47 provinces in the Philippines with at least 500 MW of wind potential and 25 provinces with at least 1,000 MW of wind potential. However, detailed studies are needed to assess technical and economic feasibility of specific projects in selected sites. The project was developed after a series of such detailed studies including a wind monitoring program conducted over two years at the site, a study of interconnection impacts on the Luzon grid and an assessment of growth of power demand in the area. The Department of Energy fully supports this private-sector led project, as does the province of Ilocos Norte, which sees the project as beneficial not only for the added electricity supply but also in terms of its potential as a major tourist attraction.

An independent technical review by Bank consultant has confirmed that the project technical design is consistent with international standards. Measured on-site mean annual wind speed is 6.64 m/s at 40 m, and calculated at 7.1 m/s at the 70 m hub height of the Micon NM 82 turbine. Applied to the NM 82 power curve, each 1650 kW turbine is estimated to produce 4,965.4 MWh/year. The entire 24.75 MW project (15 x1650 kW turbines) would then produce 74.48 GWh/year, corresponding to a net capacity factor of 34.4%. The NM82 represents the current generation of 1.5 MW wind

turbines that have much larger diameter rotors, taller towers, much better aerodynamic performance, and as a result, much better power curves (meaning they are able to convert more of the energy in the wind at a given location into electricity). The capacity factors of this type of turbines studied by NREL at Rocky Mountain wind sites this year show improvements from the 35% range just a few years ago to over 40% today. Thus the above estimate of 74.48 GWh/year energy production is considered reasonable.

The NM82 has power electronics that smooth cut-in to the grid and computer control that optimizes power production. Its hydraulically activated blade adjustment provides greatly improved power control, with the ability to quickly reduce wind loads during high wind speed events. In sustained high winds, the blades feather and the rotor freewheels to reduce loadings on the turbine and tower, making it suitable for use in an area frequently visited by typhoons.

The TransCo System Impact Study shows that the project can readily be connected to the INEC/TransCo grid, subject only to installation of 25 MVAR of capacitive compensation. In fact, the project will decrease loadings on the existing San Esteban-Bantay-Laoag 115kV line by 45%, and will strengthen the regional grid by inserting power at the end of a long line where voltages are now weak. The short-circuit analysis found that the tripping of project generation had no effect on system frequency, i.e., that frequency remained within acceptable levels after tripping (and far below the fault current interrupting capacity of the TransCo breakers).

3. Social and Environmental

a) Environmental Category and Safeguard Policies Triggered

Applicable?	**Safeguard Policy** If Applicable, How Might It Apply?
[x]	**Environmental Assessment (OP/BP 4.01)**
[ ]	**Natural Habitats (OP/BP 4.04)**
[ ]	**Pest Management (OP 4.09)**
[ ]	**Involuntary Resettlement (OP/BP 4.12)**
[ ]	**Indigenous Peoples (OD 4.20)**
[ ]	**Forests (OP/BP 4.36)**
[ ]	**Safety of Dams (OP/BP 4.37)**
[ ]	**Cultural Property (draft OP 4.11 - OPN 11.03)**
[ ]	**Projects in Disputed Areas (OP/BP/GP 7.60)***
[ ]	**Projects on International Waterways (OP/BP/GP 7.50)**

The project is assigned Environmental Category “B” since its social and environmental impacts are expected to be benign, reversible and short term. The project will have not have any gaseous emissions or liquid discharges and it will displace/avoid greenhouse gas emitting power generation sources. The EA policy is triggered due to the anticipated environmental impacts from civil works

activities related to the construction of wind turbines and the installation of transmission lines. No other safeguard policies are triggered.

b) Social Issues

The project is being received very favorably by both local governments and local residents not only because they regard wind power as a clean energy source but also because of the anticipated economic benefits in terms of improved employment opportunities, additional tax revenues, and increased tourist visits. The project is also expected to substantially improve the local power supply, benefiting both the domestic and commercial clients of the local electric cooperative.

There are no significant social issues that can be associated with the project. The concerns raised only revolve around suggesting ways to enhance the project's local developmental impacts, viz.: (1) improving employment opportunities for residents from host villages during construction and operation of the project, and (2) the implementation of a concrete social development support for the residents of the host communities. The proponent has been implementing local hiring policy that favors residents of the host communities in coordination with local government units. It has also committed to implement a social development program for the host villages.

c) Environmental Issues

The proponent has prepared separate environmental assessments (EAs) for wind turbines and for the transmission line and has obtained environmental permits for both under Philippine laws. The EAs have not identified any significant environmental and social impacts from the project. However site inspections and subsequent evaluation of additional information and marine ecosystem baseline study, which the Bank requested from the proponent, resulted in the identification of two environmental issues needing further actions. These are: (1) the possibility of sediments reaching the coral reef area; and (2) the possibility of the windfarm area being a nesting site for green sea turtle (*Chelonia mydas*), an endangered species.

d) Social and Environmental Management Measures

Specific actions to address the social and environmental issues/concerns have been identified. These are: (1) the formulation and implementation of social development program for the host villages to be financed from a portion of the credit to be derived from the carbon facility; (2) the observance/installation of appropriate silt prevention measures; and (3) the conduct of detailed assessment on green sea turtle nesting in the windfarm area. The proponent shall be responsible for

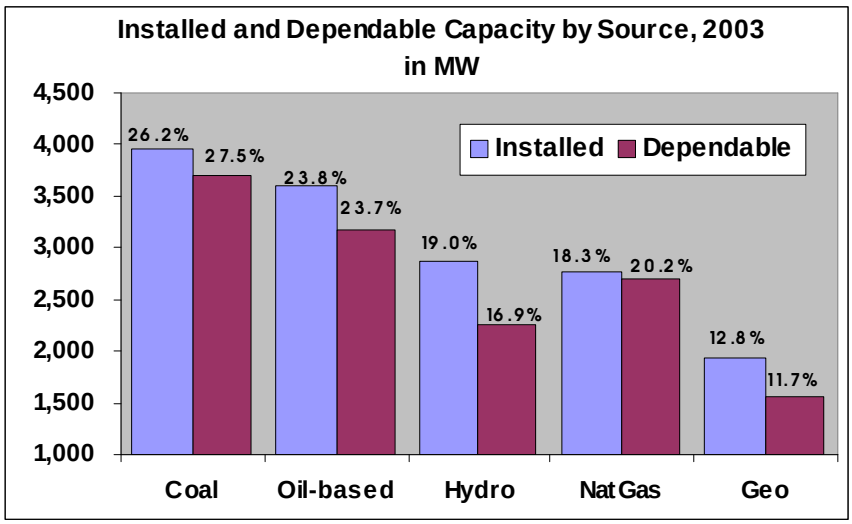
carrying out these actions as well as the other social and environmental management measures it has committed to undertake as part of the project.

The Bank and NWPDC have agreed on management measures and/or further actions as well as the indicators through which compliance will be verified by the Bank or by the third party auditors. The matrix of management measures and indicators are in Annex 10, Table 3. The third party auditor will be tasked to monitor implementation of environmental and social development plans of the proponent while the Bank will also undertake regular supervision of safeguard implementation and compliance. To facilitate compliance monitoring and audit, the proponent will be required to submit semi-annual safeguard compliance report to the Bank.

TECHNICAL ANNEX 1: POWER SECTOR BACKGROUND

Capacity fuel mix

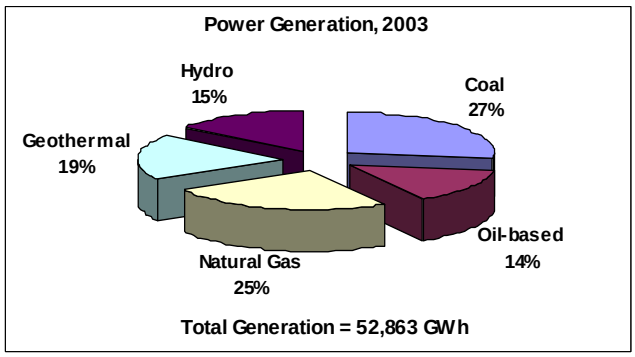
Coal-fired plants remain to be the dominant type of power generation in the country. As of end-2003, installed capacity of coal-fired power plants accounted for 26% of the total generating capacities in the country or 3,958 MW. Most of these coal-fired power plants are located in Luzon, accounting for 32% of the total installed capacity in Luzon. Oil-based power plants comprise 24% of the capacity mix.



Hydroelectric power has the highest contribution among indigenous resources, with a share of 19% to total capacity. In Mindanao grid, hydroelectric power facilities represent almost 60% of the capacity mix. Since the commissioning of natural gas in 2002, its share to the capacity mix increased to 18% (2,763 MW) and even higher at 23% among the Luzon-based power generating facilities. Geothermal, which is dominant in the Visayas, contributes about 13% or 1,932 MW of the capacity mix.

Generation fuel mix

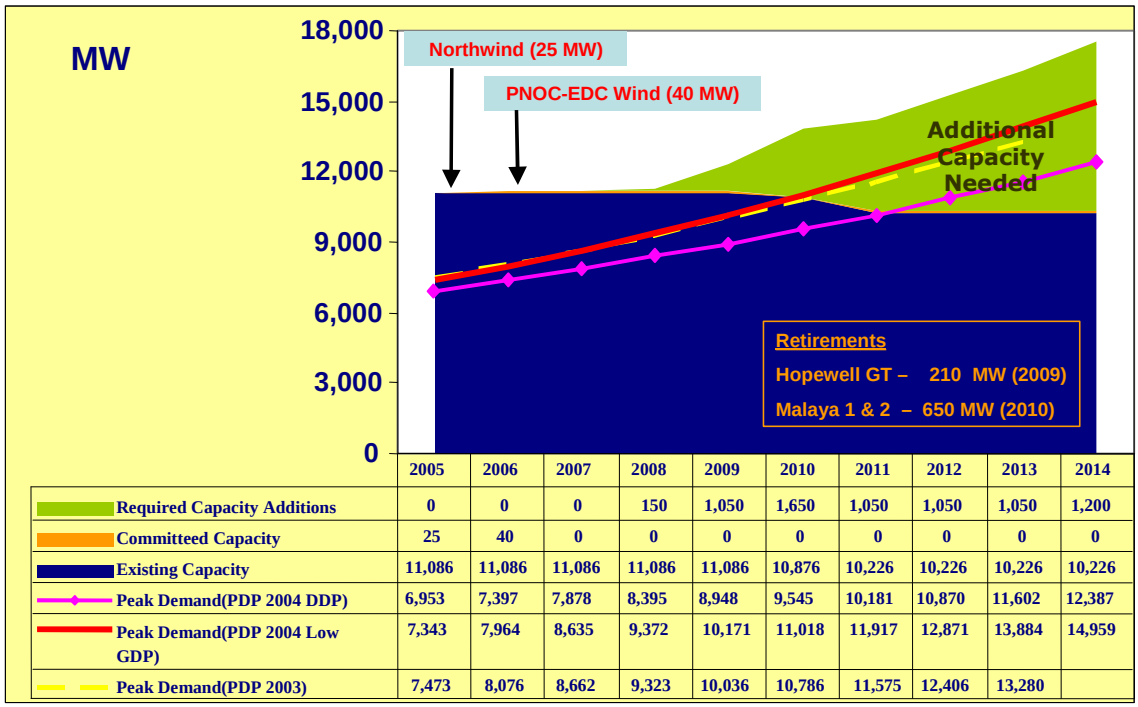
The country's total electricity generation in the main grids in 2003 is estimated at 52,863 GWh, indicating 9.1% increase compared to its 2002 level of 48,647 GWh. Coal remained as the highest contributor of electricity and posted a generation of 14,517 GWh or 28% of the total, although its volume was reduced by 10% compared to its 2002 level of 16,125 GWh. This can be attributed to several factors: more diversified utilization of existing generating facilities in Luzon with the full commercialization of natural gas for power and more production of oil-based plants in Visayas particularly in Cebu with the operational problems of coal-fired power plants.



Luzon Power Grid Supply and Demand

In the short term, the overall Luzon grid is characterized by surplus power generation; this Project and another wind farm project (40MW) in Ilocos Norte are the only two new plants committed thus far for Luzon. Based on DOE's projection, power demand will exceed supply from the existing and committed plants by 2008.

Supply Demand Profile
Luzon 2005-2014



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Required Capacity Additions	0	0	0	150	1,050	1,650	1,050	1,050	1,050	1,200
Committeed Capacity	25	40	0	0	0	0	0	0	0	0
Existing Capacity	11,086	11,086	11,086	11,086	11,086	10,876	10,226	10,226	10,226	10,226
Peak Demand(PDP 2004 DDP)	6,953	7,397	7,878	8,395	8,948	9,545	10,181	10,870	11,602	12,387
Peak Demand(PDP 2004 Low GDP)	7,343	7,964	8,635	9,372	10,171	11,018	11,917	12,871	13,884	14,959
Peak Demand(PDP 2003)	7,473	8,076	8,662	9,323	10,036	10,786	11,575	12,406	13,280	

Renewable Energy Policy Framework

This policy framework embodies the DOE's objectives, goals, policies and strategies as well as programs and projects to further develop the RE sector within the perspective of the sector's supply and demand prospects and current stage of development given its critical role in the country's energy future. It is the government's policy to facilitate the energy sector's transition to a sustainable system with RE as an increasingly prominent, viable and competitive fuel option. The shift from fossil fuel sources to renewable forms of energy is a key strategy in ensuring the success of this transition. Moreover, current initiatives in the pursuit of this policy are directed towards creating a market-based environment that is conducive to private sector investment and participation and encourages technology transfer and research and development. Thus, current fiscal incentives provide for a preferential bias to RE technologies and projects which are environmentally sound.

Energy Sector Objectives, RE Goals, Policies and Strategies

Energy Sector Objectives	RE Goals	RE Policies and Strategies
Ensure sufficient, stable, secure, accessible and reasonably-priced energy supply Pursue cleaner and efficient energy utilization and clean technologies adoption Cultivate strong partnership and collaboration with key partners and stakeholders Empower and protect welfare of various energy publics	Increase RE-based capacity by 100% by 2013 • Be the number one geothermal energy producer in the world • Be the number one wind energy producer in Southeast Asia • Double hydro capacity by 2013 • Expand contribution of biomass, solar and ocean energy by 131 MW Increase non-power contribution of RE to the energy mix by 10 MMBFOE in the next ten years	Diversify energy mix in favor of indigenous RE resources Promote wide-scale use of RE as alternative fuels and technologies Transform Negros island as a model of RE development and utilization Make the Philippines a manufacturing hub for PV cells to facilitate development of local manufacturing industry for RE equipment and components Encourage greater private sector investments and participation in RE development through market-based incentives Establish responsive market mechanisms for RE-generated power Formulate an effective management program for fuelwood utilization with the view of reducing environmental impact

Wind Power

The Philippines, being situated on the fringes of the Asia-Pacific monsoon belt, exhibits a promising potential for wind energy. Data from the Philippine Geophysical Astronomical Services Administration (PAG-ASA) shows that the country has a mean average of about 31 watts per square meter (W/m^2) of wind power density. In addition, a study conducted by the USDOE-NREL in 1999 shows over 10,000 sq. km. of windy land areas estimated to exist with a good-to-excellent wind resource potential. Using conservative assumptions of about 7 MW per sq. km., this windy land could theoretically support over 70,000 MW of potential installed capacity. The same study shows that there are 47 provinces out of 73 in the Philippines with at least 500 MW of wind potential and 25 provinces with at least 1,000 MW of wind potential. Despite the maturity of the technology, however, wind power is still not the least cost option in most cases. The DOE realizes that a multi-year commercialization program featuring the private sector must be started as soon as

possible to reduce financing and other market barriers. It recently developed a Wind Power Investment Kit for potential private investors that outlines prospects for wind projects in the Philippines and the various incentives that would be made available.

TECHNICAL ANNEX 2: MAJOR RELATED PROJECTS FINANCED BY THE BANK AND/OR OTHER AGENCIES

The most directly related project is the Bank-GEF financed Rural Power Project, the first phase of an Adaptable Program Loan (APL) aimed at supporting reforms and priority investments in the rural power sector, and removal of barriers for renewable energy development. The electrification investments are for: (1) grid-connected electric cooperative (EC) subprojects; and, (2) decentralized electrification. The first type of subprojects will improve power supply systems ' safety, reliability, efficiency and power service quality for existing customers, through rehabilitation and capacity upgrades of the existing supply system; remove supply system constraints, encourage institutional development of ECs, and, improve employee productivity, safety, and, efficiency of customer service provision. The second type of investments will be in small power generation, decentralized grids, and stand-alone renewable energy technologies (RET) systems, most notably photovoltaic (PV) systems. The Partial Credit Guarantee Fund component will help establish, and provide grant funds to partially cover loan losses incurred in the provision of loans to RET purchasers, and suppliers. This component is funded by a United Nations Development Program (UNDP)-Global Environment Facility (GEF) grant. Finally, the third component will support the DOE, Energy Regulatory Commission, the Development Bank of the Philippines, participating financial intermediaries, and participating enterprises in reducing market barriers for the commercialization of RETs, by building capacity of concerned public, and private sector entities. Investment risks would be reduced through strong project development, appraisal, procurement, and supervision of RET subprojects, and, by supporting implementation policies on energy tariffs and subsidies, and on regulation, and planning. This component is funded by a Bank-GEF grant. Other related completed, ongoing or planned electrification projects are shown in the following table:

Sector Issue	Project	Latest Supervision (PSR) Ratings	
		Implementation Progress (IP)	Development Objective (DO)
Implement Phase 1 of APL with overall aim of supporting reforms and priority investments in rural power sector and to remove barriers for renewable energy development	Bank/GEF financed Rural Power Project	S	S
Implementation of a partial credit guarantee program and related capacity building activities for selected electric cooperatives to promote energy efficiency and system loss reduction	GEF-financed Electric Cooperative System Loss Reduction Project	S	S

S = Satisfactory

TECHNICAL ANNEX 3: RESULTS FRAMEWORK AND MONITORING

A detailed results and monitoring framework is presented in Annex 13 (Project Design Document)

TECHNICAL ANNEX 4: DETAILED PROJECT DESCRIPTION

Overview

The wind farm power plant will be owned and operated by the Northwind Power Development Corporation (NWPDC). The technical design was made by the Danish consulting firm, TRIPOD Wind Energy Aps. The project will be executed on turnkey basis by NEG Micon (NEGM) an internationally recognized Danish manufacturer of wind turbines. The wind farm shall have 15 units of wind turbines each rated at 1650kW. The total installed capacity is 24.75MW with an annual production estimated at about 74.48 GWh.

The windfarm will be grid-connected and all power produced will be sold to the Ilocos Norte Electric Cooperative (INEC) under a 20 year power purchase agreement. Certified Emission Reductions (CERs) during plant operation will be purchased by the PCF. No other Bank Group financing assistance is involved.

Site Layout and Wind Regime

The wind turbines are of the active stall type arranged in an arc, single row, each turbine evenly spaced at 323 meters, and stretching approximately 4.5 km along the shoreline. Each turbine has a 600V/13.8kV step-up transformer and shall be grouped into three. The power from each group will then be combined into one 13.8 kV/69 kV step-up transformer and transmitted to the national grid via a 50 km overhead line and connected to the ultimate customer, INEC switchyard at Laoag City. The turbines shall use asynchronous generators utilizing microprocessor based integrated electric controllers. Revenue meters will be located at the Project's outgoing circuits.

Based on wind data obtained from the period August 2000 to July 2002, mean annual wind speed at a height of 40M is 6.64 m/s. The yearly average wind speed at hub height of 70M is 7.1 m/s. On site prevailing wind direction is east northeast where 60% of the total annual energy is derived. Operational temperature limits are at 20°C to 40°C.The maximum instantaneous wind speed measured at the site is 44m/s. This wind speed has been measured at 40M height during a typhoon in July 2001. The humidity is high and assessed to be in the area of 85 to 95 percent relative humidity. Average air density is 1.17kg/m3.

Turbine Characteristics

The wind turbines are designed, tested and manufactured by NEGM of Denmark. The particular model to be used was issued a Statement of Compliance by Det Norske Veritas (DNV) last December 1, 2003. The NM 82/1650 Bangui Bay version complies with requirements as outlined in IEC61400-1:1999 and IEC WT01 covering the actual conditions:

Ve50 of 70m/s
Vaverage of 7.0m/s at 50M

I15 of 11% at 50M

The turbine is equipped with 3 pitchable blades and mechanical brakes acting on the high-speed side of the gear. Blades and mechanical brakes are driven independently by hydraulics and designed to be fail-safe even if the system is not pressurized.

The nacelle machine base frame has a glass fiber enclosure effectively screening and protecting all interior components from damages from the harsh environment at the site. All interior components are fitted to allow easy access and service. Lubrication and hydraulic oil pumps together with heat exchangers are assembled as a single system closely monitored and controlled by an on-board computer.

The active stall type of turbine control is a hydraulically activated blade adjustment that provides the following operational advantages:

- Increased level of power control and reduction of harmful wind loads that affects wind turbines of this size.
- Optimal power quality during acceleration and soft cut-in to the grid.
- Optimal current control when using blade adjustment to switch between the large and small generator.
- At wind speeds around the rated output, production is maintained regardless of variations in air density.
- On excessive wind conditions, blades are turned through 90° (neutral position) on a rotor freewheeling mode considerably reducing imposed loads on the turbine and structure.

The unit is supplied with an integrated transformer solution. The main high voltage transformer used by the generator is integrated within the nacelle while the other transformer providing power to the control systems and motors are located in the tower base.

The yawing system is constructed as a bearing system with active yawing and yawing brakes mounted directly on the lower side of the machine bed. Yawing is performed automatically depending on sent signals from the wind vanes above the nacelle.

Transmission System Impact

Grid interconnection via electrical synchronization is achieved automatically by the asynchronous type AC generators. The unit contains a number of advanced computer systems that constantly monitor and control the power plant. This system continually compares recorded data with preset operational tolerances and adjusts accordingly to optimize power production.

TRANSCO conducted a System Impact Study of interconnecting the 25 MW Bangui Bay wind project to the INEC grid. It showed that the project can readily be connected to the INEC/TransCo grid, subject only to installation of 25 MVAR of capacitive compensation. In fact, the project will decrease loadings on the existing San Esteban-

Bantay-Laoag 115kV line by 45%, and will strengthen the regional grid by inserting power at the end of a long line where voltages are now weak.

TransCo's loadflow analysis found that the existing San Esteban-Bantay-Laoag 115kV line can accept the power from the project with no upgrades needed. Normal operation requires only 5 MVAR of compensation to keep line voltage at 1.0 pu. The dynamic analysis found that the addition of a second San Esteban-Bantay-Laoag (SBL-2) 115kV line, which TransCo plans to construct in 2004, decreases the amount of capacitive compensation required from 25 MVAR to 15 MVAR (i.e., the system remains stable during faults when only 15 MVAR of compensation is available). This notwithstanding, TransCo continues to require the project to install 25 MVAR of reactive compensation, in order to have that amount available when SBL-2 is down for maintenance.

The short-circuit analysis found that the tripping of project generation had no effect on system frequency, i.e., that frequency remained within acceptable levels after tripping (and far below the fault current interrupting capacity of the TransCo breakers).

Electricity Sales Agreement

The ESA with INEC for wind-generated electricity stipulates a price lower than the average price charged by NPC in the region. However, due to the intermittent nature of the wind resource, electricity sales will be on "as-and-when-available" basis. The power plant will operate synchronized to the grid and will be complemented by NPC's supply during period of weak winds. During periods of strong winds (expected about October to March) excess generation will be sold to other utilities or the spot market.

Purchase of Emission Reductions

The target annual ERs is 35,600 tCO2e per year, as provided under the ERPA.The PCF will purchase the ERs at $4.25 per tCO2e based on actual energy output as independently verified each year after plant commissioning.

TECHNICAL ANNEX 5: PROJECT COSTS

Project Cost		
Total capacity per farm	24.75 KW	
	PHP Mn	**USD Mn**
Project Development & Management	57	1
EPC:		
Equipment & Transport	1,246	22
Civil Works & Installation	264	5
Miscellaneous	82	1
Others	59	1
Substation & Transmission Line	102	2
Start-up funding	3	0
Taxes	120	2
Interest During Construction	54	1
Other Financing Charges	6	0
TOTAL	**1,994**	**35.4**

Engineering & Procurement Contract*		
	Peso (x1000)	**US$ (x1000)**
Wind Turbines ex. Works	1,097,997	19,513
Tools & Safety equipment	3,601	64
Consumables & wear parts	9,735	173
Contingency spare parts	3,376	60
SCADA system	7,034	125
Meteorological measuring mast	4,277	76
Other imported equipment & materials	6,977	124
Equipment domestically procured	13,336	237
Transport to harbor in the Philippines	87,500	1,555
Transport in the Philippines	12,379	220
Foundations: equipment & construction	120,587	2,143
Electrical construction works (13.8kv & sgni cables)	84,405	1,500
Installation of wind turbines etc.	54,469	968
Other civil works	4,839	86
Commissioning & tests on completion	6,640	118
Training including travel	281	5
Manuals & documentation including certificates & approvals	-	-
Warranty in defects notification period	42,203	750
Service & maintenance in defects notification period	15,418	274
Power performance verification	-	-
Technical assistance	5,289	94
Others	12,548	223
2 years extension of service maintenance	19,695	350
2 year extension of warranty	39,220	697
Wind Turbine Substation 13.8/69 KV	61,897	1,100
69 kV Trans line Site to Matchpiont	40,402	718
Total (millions)	**1,754.1**	**31.2**

**: as of September 2004*

TECHNICAL ANNEX 6: IMPLEMENTATION ARRANGEMENTS

The detailed implementation arrangements are presented in the "Prototype Carbon Fund Emission Reductions Purchase Agreement (ERPA)" signed between **Northwind Power Development Corporation** and **International Bank for Reconstruction and Development,** as trustee of the Prototype Carbon Fund. The ERPA is attached to this document.

TECHNICAL ANNEX 7: FINANCIAL MANAGEMENT AND DISBURSEMENT ARRANGEMENTS

This annex is not required for PCF projects.

TECHNICAL ANNEX 8: PROCUREMENT

This annex is not required for PCF projects.

TECHNICAL ANNEX 9: ECONOMIC AND FINANCIAL ANALYSES

Project evaluation was conducted by the Bank largely based on the desk review of the available data and information as well as field visits and meetings with NWPDC and INEC. The documents reviewed included, among others, the Appraisal Report prepared by COWI/Tripod to Danish Ministry of Foreign Affairs and Danida (May 2003), Project Concept Note prepared by NWPDC (January 2004), and subsequent updates provided by NWPDC.

Assumptions:

1. ***Power production*** – The Project is located in a region which is considered to have excellent wind resource potential. The project is reasonably expected to produce 74.48 GWh annually, representing a net capacity factor of 34%. To assess the downside risk, sensitivity analysis has been carried out for a reduction of capacity factor to 28%, with annual production of about 59.58 GWh.

2. ***Power price*** – in accordance with the ESA, power price will be pegged at a 7% discount from the NPC rate until the expiry of the contract between NPC and INEC in December 2005, and thereafter, a 5% discount from INEC's alternative power supply. For purposes of the economic and financial analyses, the effective NPC tariff of P4.43 per kWh (net of prompt payment discount of 3%) in 2004 is assumed for 2005, thereafter adjusted with projected local inflation rates and foreign exchange rates between Peso and US dollar. This is a conservative assumption as NPC tariff is expected to increase in 2005.

3. ***Project cost*** – based on actual EPC contract price. Additional capital expenditures, assumed to be 10% of the EPC contract price, are assumed for year 2014.

4. ***Project financing*** -- About 87% of the project funded by a mixed credit from DANIDA, with a senior loan of $29.4 million and a subordinated loan of $1.4 million. This is contingent on the Project sponsor securing a loan guarantee by a government agency, Philippine EXIM Bank (Phil Exim). Part of the collateral requirements for Phil Exim to guarantee the loan is for the project sponsor to assign the carbon credits secured under the Project to Phil Exim. Detailed project financing plan is shown below.

Project Financing

	USD Mn	Debt / Equity ratio	PHP Mn
Equity			
NorthWind	0.7		41
FABMIK	1.1		62
Moorland-	1.8		101
NEGM	0.8		42
Contingency	0.3		17
Total	**4.7**	**13%**	**263**
Debt			
Senior Loan	29.4		1,652
Subordinate Loan	1.4		78
Total	**30.8**	**87%**	
Total Sources	**35.4**	**100%**	**1,994**

5. ***Local inflation*** (% per annum) and ***foreign exchange rates*** (Peso to US$)

	2004	2005	2006	2007	2008
Inflation average	4.26	4.50	4.50	4.50	4.50
FX average	56.27	57.93	59.79	61.61	63.48

6. ***Emission Reductions credits*** -- The Emission Reductions Purchase Agreement (ERPA), recently negotiated between NWPDC and the Bank (acting as trustee for PCF), provides for a price of $4.25 per tCO_2e and target annual ERs of 35,600 tCO_2e. The exact amount of ERs eligible for purchase is determined by a Baseline Study and by independent verification of actual energy output each year after plant commissioning.

7. ***Transmission loss***: 2%

8. ***Operating expenses****:* NEGM is covering 100% of O&M expenses for the first five years as 'sweat equity' in return for shares in the project. However, as a prudent practice, the analysis has assumed 1% of the initial capital investment in the first five years of operation and 3% from year six onwards. Expenses have also been adjusted to inflation.

9. ***Depreciation****:* Twenty years straight line

10. ***Income tax rate****:* 32% after first seven years tax holiday for the Project

11. ***Long term debt****:* With 87/13 debt /equity ratio; a ten year senior loan at an interest rate of 2.625% per annum and repayment beginning in June 2005 with grace period of one year from drawdown. Subordinated loan with an interest rate of 4.5% and a grace period of one and a half years from drawdown is assumed.

12. ***Accounts receivable/payable***: A/R and A/P have been estimated to cover six months worth of revenues and cash operating expenses respectively.

Economic Analysis

The costs and benefits estimated for the calculation of both economic and financial rates of return are assumed to be the same, except for the exclusion of taxes in the case of the economic rate of return (ERR). The main project benefits will be derived from sales of wind power to INEC, while carbon credits will contribute to additional revenues at the margin. The main project cost is related to the up-front capital cost, while the operating and maintenance costs are minimal. The ERR, estimated at about 13% (in real terms), is satisfactory.

Economic Rate of Return
(Millions of Pesos)

	Costs				Benefits			Net Cashflow		
Year	Investment (PHP Mn)	O&M Costs (PHP Mn)	Working Capital (PHP Mn)	Total Costs (PHP Mn)	Sales (PHP Mn)	ER values (PHP Mn)	Total Benefits (PHP Mn)	Net Cashflow Nominal price (PHP Mn)	Deflation Factor	Net Cashflow in constant 2004 prices (PHP Mn)
2004	(1,819.72)			(1,819.72)			-	(1,819.72)	1.00	(1,819.72)
2005	-	(17.26)	(37.40)	(54.66)	235.30	6.39	241.68	187.02	1.04	178.97
2006	-	(20.84)	(16.36)	(37.20)	334.89	8.51	343.40	306.20	1.09	280.41
2007	-	(20.84)	(2.51)	(23.35)	349.96	8.51	358.47	335.12	1.14	293.67
2008	-	(20.84)	(10.90)	(31.75)	365.70	8.51	374.22	342.47	1.19	287.19
2009	-	(20.84)	(2.74)	(23.59)	382.16	8.51	390.67	367.09	1.25	294.58
2010	-	(20.84)	5.41	(15.43)	399.36	8.51	407.87	392.44	1.30	301.36
2011	-	(62.53)	3.95	(58.57)	417.33	8.51	425.84	367.27	1.36	269.89
2012	-	(62.53)	(3.13)	(65.66)	436.11	8.51	444.62	378.96	1.42	266.49
2013	-	(62.53)	(3.27)	(65.80)	455.73	8.51	464.25	398.45	1.49	268.13
2014	(181.97)	(62.53)	(3.42)	(247.92)	476.24	8.51	484.75	236.84	1.55	152.51
2015	-	(62.53)	(3.57)	(66.10)	497.67	8.51	506.19	440.09	1.62	271.19
2016	-	(62.53)	(2.31)	(64.84)	520.07	-	520.07	455.23	1.70	268.44
2017	-	(62.53)	(3.90)	(66.43)	543.47	-	543.47	477.04	1.77	269.19
2018	-	(62.53)	(4.08)	(66.60)	567.93	-	567.93	501.32	1.85	270.71
2019	-	(62.53)	(4.26)	(66.79)	593.48	-	593.48	526.70	1.94	272.16
2020	-	(62.53)	(4.45)	(66.98)	620.19	-	620.19	553.21	2.02	273.56
2021	-	(62.53)	(4.65)	(67.18)	648.10	-	648.10	580.92	2.11	274.89
2022	-	(62.53)	(4.86)	(67.39)	677.26	-	677.26	609.87	2.21	276.16
2023	-	(62.53)	(5.08)	(67.61)	707.74	-	707.74	640.13	2.31	277.38
2024	-	(62.53)	(5.31)	(67.84)	739.59	-	739.59	671.75	2.41	278.55
Total	**(2,001.69)**	**(996.85)**	**(112.84)**	**(3,111.38)**	**9,968.27**	**91.52**	**10,059.79**	**6,948.41**		**3,505.71**
									ERR	**13.2%**

Financial Analysis

(a) Project Returns

The financial rate of return (FRR), estimated at about 11% (in real terms), is satisfactory. The results of sensitivity analysis indicated that even under the low scenario of 20% lower gross revenues, the FRR of 7.3% remains well above the weighted cost of capital of the private project entity, estimated at about 4.2% (with its debt financing cost of about 3% p.a. before tax and 1.6% p.a. after tax; and cost of equity assumed to be 20%). Insofar as the private investor is concerned, the key financial indicator is the after-tax return on equity (ROE), which is expected to be robust at 39.5% and 23.1% under the base case and low scenario, respectively. The carbon credits, estimated at about $151,300 per year, totaling about $1.5 million during the ten-year period (2005-2014), are not expected to have a significant impact on the FRR although they are critical as a credit enhancement to facilitate credit access for project financing.

Financial Rate of Return
(in Million Pesos)

	Costs						Revenues				
Year	Investment (PHP Mn)	O&M Costs (PHP Mn)	Changes in Working Capital (PHP Mn)	Total Costs (PHP Mn)	VAT Reimbursement (PHP Mn)	Income Taxes (PHP Mn)	Total Costs (PHP Mn)	Sales (PHP Mn)	ER Credits (tons CO2e)	ER values (PHP Mn)	Total Revenues (PHP Mn)
2004	(1,939.40)			(1,939.40)	-		(1,939.40)				-
2005	-	(17.26)	(37.40)	(54.66)	-	-	(54.66)	235.30	26,700	6.39	241.68
2006	-	(20.84)	(16.36)	(37.20)	-	-	(37.20)	334.89	35,600	8.51	343.40
2007	-	(20.84)	(2.51)	(23.35)	-	-	(23.35)	349.96	35,600	8.51	358.47
2008	-	(20.84)	(10.90)	(31.75)	49.67	-	17.92	365.70	35,600	8.51	374.22
2009	-	(20.84)	(2.74)	(23.59)	49.67	-	26.08	382.16	35,600	8.51	390.67
2010	-	(20.84)	5.41	(15.43)	-	-	(15.43)	399.36	35,600	8.51	407.87
2011	-	(62.53)	3.95	(58.57)	-	-	(58.57)	417.33	35,600	8.51	425.84
2012	-	(62.53)	(3.13)	(65.66)	-	(86.20)	(151.85)	436.11	35,600	8.51	444.62
2013	-	(62.53)	(3.27)	(65.80)	-	(93.86)	(159.66)	455.73	35,600	8.51	464.25
2014	(193.94)	(62.53)	(3.42)	(259.89)	-	(101.81)	(361.70)	476.24	35,600	8.51	484.75
2015	-	(62.53)	(3.57)	(66.10)	-	(109.71)	(175.81)	497.67	35,600	8.51	506.19
2016	-	(62.53)	(2.31)	(64.84)	-	(114.50)	(179.34)	520.07	-	-	520.07
2017	-	(62.53)	(3.90)	(66.43)	-	(121.99)	(188.42)	543.47	-	-	543.47
2018	-	(62.53)	(4.08)	(66.60)	-	(129.82)	(196.42)	567.93	-	-	567.93
2019	-	(62.53)	(4.26)	(66.79)	-	(134.80)	(201.59)	593.48	-	-	593.48
2020	-	(62.53)	(4.45)	(66.98)	-	(143.35)	(210.33)	620.19	-	-	620.19
2021	-	(62.53)	(4.65)	(67.18)	-	(152.28)	(219.46)	648.10	-	-	648.10
2022	-	(62.53)	(4.86)	(67.39)	-	(161.61)	(229.00)	677.26	-	-	677.26
2023	-	(62.53)	(5.08)	(67.61)	-	(171.36)	(238.97)	707.74	-	-	707.74
2024	-	(62.53)	(5.31)	(67.84)	-	(181.56)	(249.39)	739.59	-	-	739.59
Total	**(2,133.34)**	**(996.85)**	**(112.84)**	**(3,243.04)**	**99.34**	**(1,702.86)**	**(4,846.55)**	**9,968.27**	**382,700**	**91.52**	**10,059.79**

Net Cashflow

Year	Net Cashflow: Project FRR (Nominal Prices)	Deflation Factor	Cashflow: Project IRR (Constant 2004 Prices)	Equity Investment (PHP Mn)	Financing Activities (PHP Mn)	Net Cashflow: ROE (Nominal Prices)	Net Cashflow: ROE (Constant 2004 Prices)
2004	(1,939.40)	1.00	(1,939.40)	(263.46)	-	(263.46)	(263.46)
2005	187.02	1.04	178.97	-	(103.71)	83.31	79.72
2006	306.20	1.09	280.41	-	(223.02)	83.18	76.17
2007	335.12	1.14	293.67	-	(217.98)	117.13	102.64
2008	392.14	1.19	328.85	-	(212.94)	179.20	150.27
2009	416.76	1.25	334.44	-	(207.90)	208.86	167.60
2010	392.44	1.30	301.36	-	(202.86)	189.58	145.58
2011	367.27	1.36	269.89	-	(182.49)	184.77	135.78
2012	292.77	1.42	205.88	-	(178.16)	114.61	80.59
2013	304.58	1.49	204.96	-	(173.82)	130.76	87.99
2014	123.06	1.55	79.24	-	(169.49)	(46.43)	(29.90)
2015	330.38	1.62	203.58	-	(83.27)	247.11	152.27
2016	340.73	1.70	200.92	-	-	340.73	200.92
2017	355.05	1.77	200.35	-	-	355.05	200.35
2018	371.51	1.85	200.61	-	-	371.51	200.61
2019	391.89	1.94	202.51	-	-	391.89	202.51
2020	409.86	2.02	202.67	-	-	409.86	202.67
2021	428.64	2.11	202.83	-	-	428.64	202.83
2022	448.26	2.21	202.98	-	-	448.26	202.98
2023	468.77	2.31	203.12		-	468.77	203.12
2024	490.20	2.41	203.26	-	-	490.20	203.26
Total	**5,213.23**	**33.78**	**2,561.10**	**(263.46)**	**(1,955.66)**	**4,933.52**	**2,704.54**
		FRR	**10.9%**			**ROE**	**39.5%**

(b) Project Entity, NWPDC

Northwind Power Development Corporation (NWPDC) was incorporated in May 2000 and has been responsible for the development of this project. The principals of NWPDC have years of experience in power projects and project management. NWPDC's finances are expected to be satisfactory, with debt service coverage ratio (DSCR) projected to be at least 1.4 times under the base case, and at least 1.1 time under the low production scenario. Its net profit margin is expected to be robust at no less than 43% of the gross revenues. The projected financial highlights, income statements, cash flows and balance sheets of NWPDC are shown below.

NWPDC's Financial Indicators (2005-2008)
(P Million)

Financial Year Ending December 31	2005	2006	2007	2008
Energy Sales (MWh)	54,743	72,990	72,990	72,990
Energy Sales Growth (%)	-	33.3%	0.0%	0.0%
Avg Operating Revenue (PHP/kWh)	4.3	4.6	4.8	5.7
Load factor (%)	34%	34%	34%	34%
Net Operating Revenues, PHP Mn	242	343	358	424
Net Operating Income, PHP Mn	125	223	239	304
Operating Expenses, PHP Mn	(17)	(21)	(21)	(21)
Net Income (Loss), PHP Mn	104	181	201	272
Profit Margin (%)	43%	53%	56%	64%
Tariff Increase (%)	4.3%	6.7%	4.5%	4.5%
Cashflow available for Debt service (PHP Mn)	187.09	306.31	335.22	392.05
Debt/Debt + Equity Ratio (%)	82%	73%	63%	52%
Debt Service Coverage Ratio (times)	1.8	1.4	1.5	1.8
Operating Ratio (%)	48%	35%	33%	28%

NorthWind Power Development Cooperation's Projected Income Statement
(Millions of Pesos)

	2004	2005	2006	2007	2008
Revenue from power sales	-	235.30	334.89	349.96	365.70
Revenue from Emmission Reduction	-	6.39	8.51	8.51	8.51
VAT Reimbursement	-	-	-	-	49.67
Total Operating Revenues	**-**	**241.68**	**343.40**	**358.47**	**423.89**
O&M	-	(17.26)	(20.84)	(20.84)	(20.84)
Depreciation	-	(99.72)	(99.72)	(99.72)	(99.72)
Total Operating Expenses	**-**	**(116.98)**	**(120.57)**	**(120.57)**	**(120.57)**
Operating Income (EBIT)	**-**	**124.70**	**222.83**	**237.90**	**303.32**
Less: Interest	-	(21.13)	(42.21)	(37.16)	(32.12)
Taxes	-	-	-	-	-
Net Profit (Loss)	**-**	**103.56**	**180.63**	**200.74**	**271.20**
Operating Ratio (%)	0%	48%	35%	34%	28%
Times Interest Earned (TIE) Ratio	-	5.90	5.28	6.40	9.44
Profit Margin	-	43%	53%	56%	64%

NorthWind Power Development Cooperation's Projected Cashflow Statement
(Millions of Pesos)

	2004	2005	2006	2007	2008
Key Assumptions					
Domestic Inflation (%)	4.26	4.50	4.50	4.50	4.50
Average retail price P/kWh	4.12	4.30	4.59	4.79	5.01
Energy Sales (MWh)	-	54,743	72,990	72,990	72,990
Transmission Losses (%)	-	2%	2%	2%	2%
Load Factor (%)	-	34%	34%	34%	34%
Emission Reduction (tCO2e)	-	26,700	35,600	35,600	35,600
ERs Price (PHP/tCO2e))	-	239	239	239	239
O&M (% of capex)	0	1%	1%	1%	1%
Revenue from power sales	-	235.3	334.9	350.0	365.7
Revenue from Emmission Reduction	-	6.4	8.5	8.5	8.5
VAT Reimbursement	-	.	-	-	49.7
Operating Revenues	**-**	**241.7**	**343.4**	**358.5**	**423.9**
Cash from Danida Grant	**-**	-	-	-	-
O&M	-	(17.3)	(20.8)	(20.8)	(20.8)
Change in Working Capital	-	(37.4)	(16.4)	(2.5)	(10.9)
Taxes	-	-	-	-	-
Operating Expenses	**-**	**(54.7)**	**(37.2)**	**(23.4)**	**(31.7)**
Cashflow from Operations	**-**	**187.0**	**306.2**	**335.1**	**392.1**
Capital Expenditure	(1,939.4)		-	-	-
Interest During Construction	(54.4)				
Cashflow from Invesments	**(1,993.8)**	**-**	**-**	**-**	**-**
Equity invested	263.5	-	-	-	-
Loan	1,730.3	-	-	-	-
Principal Payment	-	(82.6)	(180.9)	(180.9)	(180.9)
Interest Payment	-	(21.1)	(42.2)	(37.2)	(32.1)
Cashflow from Financing	**1,993.8**	**(103.7)**	**(223.1)**	**(218.1)**	**(213.0)**
Net Cashflow	**-**	**83.3**	**83.1**	**117.0**	**179.1**
Accumulated Cashflow	-	83.3	166.4	283.4	462.6
Change in Cash	-	83.3	(0.2)	34.0	62.1
Beg Cash	-	-	83.3	83.1	117.0
End Cash	-	83.3	83.1	117.0	179.1

NorthWind Power Development Cooperation's Projected Balance Sheet
(Millions of Pesos)

	2004	2005	2006	2007	2008
Current Assets					
Cash	-	83.3	166.4	283.4	462.6
Accounts Receivable	-	40.3	57.2	59.7	70.6
Total Current Assets	-	123.6	223.6	343.2	533.2
Fixed Assets					
Gross Fixed Assets	1,993.8	1,993.8	1,993.8	1,993.8	1,993.8
Less: Acc. Depreciation	-	99.7	199.4	299.2	398.9
Net Fixed Assets	1,993.8	1,894.0	1,794.3	1,694.6	1,594.9
Total Assets	1,993.8	2,017.6	2,017.9	2,037.8	2,128.1
Liabilities					
Current Liabilities					
Accounts Payable	-	2.9	3.5	3.5	3.5
Current Portion of Debt	82.6	180.9	180.9	180.9	180.9
Total Current Liabilities	82.6	183.8	184.4	184.4	184.4
Gross Long-term Debt	1,730.3	1,647.7	1,466.8	1,285.9	1,105.0
Less: Current Portion	82.6	180.9	180.9	180.9	180.9
Net Long Term Debt	1,647.7	1,466.8	1,285.9	1,105.0	924.1
Equity					
Paid in Capital	263.5	263.5	263.5	263.5	263.5
Accumulated Earnings	-	103.6	284.2	484.9	756.1
Total Equity	263.5	367.0	547.6	748.4	1,019.6
Total Equity and Liabilities	1,993.8	2,017.6	2,017.9	2,037.8	2,128.1
Debt: Equity ratio	6.57	4.49	2.68	1.72	1.08
Debt: Debt + Equity (%)	87%	82%	73%	63%	52%
Current ratio	-	0.67	1.21	1.86	2.89
Return on Equity	0.00%	28.22%	32.98%	26.82%	26.60%

(c) Power Offtaker, INEC

INEC is among the top tier ECs that have been consistently rated A+ by the National Electrification Administration (NEA) in recent years. As a further testimony to its sound financial position, INEC is a borrower of the Rural Electrification Financing Corporation (REFC), a private commercial funding vehicle that provides long-term commercial funding to financially sound ECs. Over the past three years, its DSCR has remained robust at no less than 2.7 times. Its future finances are projected to remain satisfactory, with projected DSCR of at least 4.6 times, reflecting the recent condonation of NEA loans as provided under the EPIRA. Its past finances and projected financial highlights (2005-2008) are summarized below, along with key assumptions and projected cash flows.

INEC's Actual Financial Highlights (2001-2003)

Financial Year Ending December 31	2001	2002	2003
Energy Sales (MWh)	113,367	127,208	145,546
Energy Sales Growth (%)	-	12.2%	14.4%
Average Operating Revenue (PHP/kWh)	5.93	5.80	4.89
Net Operating Revenues, PHP Mn	672	738	711
Operating Margin, PHP Mn	(3)	(8)	(1)
Operating Expenses, PHP Mn	628	641	651
Net Income (Loss), PHP Mn	21	(46)	11
Profit Margin (%)	3%	-6%	2%
Tariff Increase (%)	-	-2%	-16%
Cash available for debt service (PHP Mn)	35	25	97
Debt Service Coverage Ratio (times)	7.5	2.7	8.5
Operating Ratio (%)	93%	87%	92%

INEC's Projected Financial Highlights (2004-2008)

Financial Year Ending December 31	2004	2005	2006	2007	2008
Energy Sales (MWh)	158,093	162,836	167,721	172,752	177,935
Energy Sales Growth (%)	8.6%	3.0%	3.0%	3.0%	3.0%
Average Operating Revenue (PHP/kWh)	5.58	5.69	5.91	6.13	6.35
Net Operating Revenues, PHP Mn	882	927	991	1,058	1,130
Operating Margin, PHP Mn	66	58	55	50	43
Operating Expenses, PHP Mn	780	824	890	959	1,033
Net Income (Loss), PHP Mn	68	60	59	55	49
Profit Margin (%)	8%	7%	6%	5%	4%
Tariff Increase (%)	14%	2%	4%	4%	4%
Cash available for debt service (PHP Mn)	132	104	101	112	110
Debt Service Coverage Ratio (times)	17.6	4.7	4.6	7.0	9.1
Operating Ratio (%)	88%	89%	90%	91%	91%

Ilocos Norte Electric Cooperative's Projected Cashflow Statement
(Philippines Pesos)

	2004	2005	2006	2007	2008
Key Assumptions					
Domestic Inflation (%)	4.3	4.5	4.5	4.5	4.5
Weighted Avg of energy costP/kWh	4.4	4.5	4.7	4.9	5.1
Average retail price P/kWh	5.6	5.7	5.9	6.1	6.4
Consumer Connections Growth Rate	2%	2%	2%	2%	2%
kWh/Consumer Connections Growth Rate	6%	1%	1%	1%	1%
Total Number of Customers connections	122,232	124,677	127,170	129,714	132,308
Energy Sales (MWh)	158,093	162,836	167,721	172,752	177,935
kWh/Customer (kwh/year)	1,293	1,306	1,319	1,332	1,345
System Losses (MWh)	19,066	19,638	20,227	20,834	21,459
System Losses (%)	12%	12%	12%	12%	12%
Energy for own use (MWh)	1,698	1,749	1,802	1,856	1,912
Energy Purchase (MWh)	178,858	184,223	189,750	195,443	201,306
Purchase from NWPDC (MWh)	0	54,743	72,990	72,990	72,990
Remaining % from other sources	100%	70%	62%	63%	64%
Cashflow from Operating Activities					
Revenues					
Revenue from Sales [1]	881,999,586	927,130,247	991,429,231	1,058,339,634	1,130,113,337
Operating Expenses					
Cost of Energy Purchased [2]	779,640,165	824,152,355	890,154,160	958,908,104	1,032,955,775
Depreciation	33,170,712	36,856,895	41,216,421	46,163,538	51,775,163
Interest	3,462,150	8,127,105	5,552,566	3,496,550	1,945,024
Operating Margin	65,726,559	57,993,891	54,506,085	49,771,443	43,437,375
Non-operating Revenues (Net)	2,156,098	2,395,698	4,533,808	5,077,988	5,695,290
Net Income	**67,882,657**	**60,389,589**	**59,039,893**	**54,849,431**	**49,132,665**
Add: Depreciation	33,170,712	36,856,895	41,216,421	46,163,538	51,775,163
Consumer accounts recievable	27,094,864	4,013,951	5,383,725	12,020,662	8,989,670
Other accounts receivable	573,688	840,179	(279,902)	(590,773)	(416,843)
Materials & suppliers	1,456,706	2,946,780	1,530,613	934,911	1,827,601
Prepayments	(1,249,826)	(65,109)	66,902	74,887	(81,972)
Accounts payable	21,766,429	9,923,270	6,359,314	10,315,514	10,161,519
Consumer deposits	3,230,271	3,106,943	2,853,367	1,878,773	1,383,670
Other deferred credits	647,058	1,506,038	925,388	1,038,956	1,029,360
Changes in working capital	(18,785,463)	(7,521,777)	(10,716,497)	(11,151,734)	(11,962,284)
Excl interest, maturing L/T debt	(3,462,150)	(8,127,105)	(5,552,566)	(3,496,550)	(1,945,024)
Internal Cash for Debt Service	**132,324,946**	**103,869,654**	**100,826,658**	**112,037,615**	**109,893,726**
Capital Expenditure and Financing					
Capital Expenditure					
Electric plant in service	(261,099,370)	41,871,193	57,929,489	65,852,520	37,608,867
Construction work in progress	(6,603,160)	(6,324,966)	7,648,025	(4,267,541)	2,854,093
Deferred debits	181,361	20,467	231,083	(197,534)	27,491
Temporary investments	981,733	939,666	883,830	857,381	915,653
Total Cashflow from investing	**(266,539,436)**	**36,506,360**	**66,692,427**	**62,244,826**	**41,406,104**
Financing Activities					
Long-term Debt	7,589,724	4,789,724	4,509,724	26,482,633	18,682,635
Medium term Debt	5,965,813	4,327,510	2,703,433	1,103,433	-
Other liabilities	1,436,552	10,372,680	5,814,562	5,579,251	4,455,129
Membership	22,197	20,791	21,255	21,365	21,402
Revaluation of Assets	39,445,007	(19,854,918)	14,533,189	(16,868,076)	(25,043,988)
Donated/contributed capital	1,946,223	1,712,678	890,848	1,356,111	1,476,465
Debt Service Payments					
Principal payment	4,047,199	14,036,128	16,434,668	12,484,846	10,116,044
Interest payment	3,462,150	8,127,105	5,552,566	3,496,550	1,945,024
Payments - NEA	9,106,800	9,106,800	9,106,800	9,106,800	9,106,800
Total Debt Service	16,616,149	31,270,034	31,094,034	25,088,196	21,167,868
Debt Service Ratio (Times)	8.0	3.3	3.2	4.5	5.2
Total Debt Service w/Loan condonation:NEA	7,509,349	22,163,234	21,987,234	15,981,396	12,061,068
Debt Service Ratio w/Loan condonation (Times)	17.6	4.7	4.6	7.0	9.1
Cashflow from Financing	**73,021,665**	**32,638,499**	**59,567,045**	**42,762,913**	**20,759,511**
Net Cashflow	**(61,192,825)**	**173,014,513**	**227,086,130**	**217,045,354**	**172,059,340**

Background

This project involves the development and operation of a wind farm consisting of about 15 wind turbine towers, a switchyard and a control station, and the installation and operation of a 50-km, 69 kV overhead transmission line. The wind turbine towers will be erected on a 9-km stretch of undeveloped and uninhabited foreshore area in Bangui Bay, which is covered by lease agreement with the Philippine Government. The transmission line will be installed along the Bangui-Laoag City stretch of the National Highway, within the existing right-of-way of the local electric utility, the Ilocos Norte Electric Cooperative (INEC). The due diligence was started in December 2003 with the initial examination of the following project documents: (1) Environmental Assessment (EA) Report for the development of the Wind Farm; (2) Environmental Compliance Certificate (ECC) for the Wind Farm issued by the Philippine Department of Environment and Natural Resources (DENR); (3) a noise study report; (4) a bird impact study report; and, (5) Project Endorsements from host Local Government Units (LGUs).

Site visits were conducted in January 12, 2004 by the bank Environmental and Social Safeguard Consultant and in January 19, 2004 by the Bank Task Team. Meetings with LGU officials, community leaders and officials of the Bangui Community Environment and Natural Resources Office (CENRO) were also held during the visits. The initial project review resulted in the request in March 31, 2004, for (1) additional information regarding the extent of civil works in the wind farm area, (2) a baseline study on the marine ecosystem of nearshore area fronting the wind farm site, (3) a clearance from the National Commission on Indigenous Peoples (NCIP) and (4) the EA and ECC documents for the Transmission Line component. The additional information on civil works together with the EA and ECC for the Transmission Line were received on May 7, 2004 while the baseline study on the marine ecosystem was submitted on May 20, 2004. The NCIP Field Base Investigation Report was submitted in September 13, 2004. These additional documents were evaluated and recommendations were forwarded to the proponent for implementation before the commencement of construction activities in July 2004. Another site visit was conducted by the second Bank Task Team in October 22, 2004 at the height of the construction activities.

Environmental Category of the Project

The project is assigned Environmental Category “B” since its environmental impacts are expected to be benign, reversible, manageable and short term. The project is not expected to alter any existing land use as the transmission line will utilize existing right-of-way and the development of the wind farm area will entail only very minimal and temporary surface disturbance. The assignment of Category “B” is also a recognition of the fact that wind energy is clean and renewable. The project will neither have any gaseous emissions nor liquid discharges. When operational, it will displace, or at least avoid the

installation of, some generating capacities of fossil fuel-fired power sources within the Luzon Grid and thus, contribute globally to the greenhouse gas emission reduction.

Bank Safeguard Policies Triggered by the Project

Of the 10-safeguards policies of the Bank, only the Environmental Assessment Policy is triggered by the project. Other bank policies such as Involuntary Resettlement (OP/BP 4.12), Indigenous Peoples (OD 4.20) and Cultural Property (OPN 11.03) were initially considered but they were eventually ruled out after site inspection and submission by the proponent of additional documents. The project is subject to the bank policy on Public Disclosure (BP 17.50).

Environmental Assessment (EA) Policy (OP/BP/GP 4.01). This policy is triggered due to the anticipated environmental impacts from civil works activities related to the construction of wind turbines and the installation of transmission line. The project is also required to undergo an EA under Philippine laws. The proponent conducted separate EAs for the Wind Farm and for the Transmission Line, following the requirements of the Philippine Environmental Impact Statement (EIS) process. The EAs were in the form of Initial Environmental Examinations (IEE) supplemented by a noise assessment study and a bird impact assessment study on wind farms. However, due to the lack of detailed information in the IEEs, additional information were requested from the proponent particularly on extent of civil works in the wind farm area and the maintenance of wind turbines. Also, since the wind turbine towers will be erected on the beach area, a baseline study on the marine ecosystem of the sea fronting the wind farm was requested. The proponent submitted the requested additional information on May 7, 2004 and the baseline study on marine ecosystem on May 20, 2004.

Public Disclosure (BP 17.50) and Stakeholder Consultation. The Philippine EIS process requires the project proponent to undertake consultations with the project stakeholders especially the host communities. The project's EA documents are also considered public documents under the Philippine EIS Law and are available at the DENR. The project preparation during the last 3 years as well as the proponent's foreshore lease application included the conduct of barangay-level and municipal-level consultations, individual visits to adjacent landowners, meetings with the provincial, municipal and barangay officials/councils, and consultations with the fishermen association in the municipality of Bangui. The high awareness and acceptance by the local leaders, fishermen and local residents of the project have been validated by the Bank Task Team during its visits to the area where it had the opportunity to meet and interview both local leaders and residents.

Social Issues

The project is regarded by the LGUs and the local residents very favorably due to the anticipated economic benefits in terms of improved employment opportunities, additional tax revenues, and increased tourist visits. The improvement in the power supply in the

area is also being seen as a magnet for investors. Fishermen look forward to the construction of an all-weather access road to be constructed as part of the project, which will improve their access to the shore area. The issues and concerns raised during consultations and interviews with the local residents are evaluated in the table below (Table 1).

Table 1. Social Issues and Concerns and Impact Assessment

Social Issues and Concerns	Assessment of Impacts
A. Construction Phase	
Land acquisition	Land acquisition is limited to a small lot for the switchyard and control station. The wind farm area is covered by a foreshore lease agreement with the Philippine government while the transmission line will utilize the existing right-of-way of INEC.
Indigenous People	A field investigation by NCIP confirmed that the wind farm area is outside IP territories.
Disruption of livelihood	Local residents will have continued access to the foreshore area.
Local employment	Local residents will be given priority in the hiring of employees and workers for the project
B. Operation Phase	
Fishermen's access to the sea	The public, including local fishermen will continue to have access to the foreshore even during the operation of the wind farm.
Social Development Program	The proponent has indicated that it will allocate funds and pursue social development program benefiting the host villages.

The project will not entail any major land acquisition. Land acquisition will be limited to a small lot needed for the switchyard and wind farm control station. It will not affect any settlement as the wind farm area is uninhabited and free from man made improvements while the transmission line will be installed over the existing distribution line of the local electric utility. The project site is outside any IP territory or ancestral domain and there are no known structure of cultural significance that could be affected by the wind farm or the transmission line. Also, the proponent has committed to adopt the Philippine Transmission Corporation (Transco) Guidelines for compensation of any damage to private properties during the installation of the transmission line. Livelihood activities in the beach area are expected to continue during and after the construction of the wind farm as continued public access to the foreshore area is ensured under the project's ECC. In addition, the proponent has committed to undertake the following social enhancement measures:

Priority hiring of local residents. The proponent has committed to work closely with the village leaders and the local government units in the hiring of local labor. Since the start of construction in July 2004, the municipal government of Bangui has been coordinating and monitoring local employment. During its October 22 site visit, the Bank Task Team observed that the proponent and local government were jointly monitoring local employment and records indicated that about 80% of laborers were residents of Bangui. Local employment was also confirmed by one of the village chiefs and a civil works contractor whom the Safeguards Team had chanced to interview.

Social development program. The proponent has verbally indicated that it will set aside funds to implement social development program for the host villages. But such was not reflected in any of the documents reviewed by the Safeguards Team. In particular, the project ECCs (Wind Farm and Transmission Line) do not require the proponent to implement any social development program. Power projects under the Philippines Energy laws are normally required to set aside social development and environmental

enhancement funds for the host communities from their annual revenue streams. However renewable energy projects such as wind power projects are exempted from these requirements (Philippine ER I-94, Section 8-b).

Environmental Issues

The EA reports for the wind turbines and transmission line did not identify any significant environmental impacts from the project. The wind farm site is uninhabited and almost bare of vegetation while the transmission line will be installed on the roadside, over the existing distribution line of the local electric utility. However, site visits and detailed review by Bank Safeguards Team of available documents and the additional information and studies provided by the proponent resulted in the identification and assessment of the following environmental issues and concerns (Table 2).

Table 2. Environmental Issues and Concerns and Impact Assessment

Issues and Concerns	Assessment of Impacts
A. Construction Phase	
Generation of dusts	Minimal dust generation is expected in the beach area because the ground is sandy and often wet. Less intense use of road is expected as turbine towers will be unloaded from the sea via LCT.
Sedimentation of nearshore waters	Excavated materials will consist almost entirely of sand and gravel and not expected to significantly alter sediment load of the normally turbid waters fronting the wind farm site. There is however a small possibility that finer sands or dirt coming from excavated materials may increase turbidity, reaching the coral reefs located beyond the project area.
B. Operation Phase	
Noise generation from wind turbines	The nearest house is about 200 meters from a wind turbine tower. Modern wind turbine technology generates minimal noise. Turbine noise is also expected to be dampened by the sounds from strong waves during windy days.
Hazard to birds	A study commissioned by Philippine National Oil Company Energy Development Corporation (PNOC-EDC) which is also developing a wind power project near the area indicated that the Ilocos Norte is not a significant route for migratory birds.
Possible oil and grease contamination of beach area	Around 2.4 kg of grease will be applied to the turbines every 6 months and approximately 260 liters of oil every two years. Contamination of the beach area by oil and grease is highly unlikely because the turbines are sealed to the surroundings and all equipment containing oil are provided with fail safe containment.
Long term impact to marine ecosystem	The baseline marine study found no corals or other critical ecosystems in the nearshore and beach area. However, a juvenile green sea turtle was sighted in the nearby waters and local residents reported turtle nestings in the area.

The above assessments indicate that the project is not expected to cause any large and long-term adverse effects to the environment. Nevertheless two issues need to be addressed by the proponent namely, the possible sedimentation of coral reefs beyond the project site and the potential presence of turtle nesting sites within the wind farm area.

Possible sedimentation of coral reefs beyond the project site. The baseline marine ecosystem study noted the dominance of sand and the absence of benthic community in the waters fronting the wind farm but it found 10%-25% coral cover starting about one kilometer westward from the last wind turbine tower. These corals are part of the continuous reef area that extends to the waters of the neighboring municipality of Burgos. There is a possibility that sediments could reach the coral reef during construction if

excavated materials from the beach area containing finer silts or soils are washed out to the sea.

Possibility of green sea turtle nestings in the Wind Farm area . The baseline marine ecosystem study, sighted a juvenile green sea turtle (*Chelonia mydas*) in the sea fronting Sitio Suyo, Barangay Baruyen. This sea turtle is one of the five species found in the Philippines and is considered an endangered species. The species is said to be common in the area and there were unverified reports of turtle nestings by local residents. Green sea turtles are known to nest between March to May. Hatchlings are attracted to light and may become disoriented if the wind turbine towers are lighted during nigh time. Also, increased human activities within the wind farm site might disrupt nestings or expose nests to poachers. If the wind farm site is a significant nesting area, mitigation and conservation measures should be implemented by the proponent to protect this endangered species.

Social and Environmental Management Measures

The following actions shall be undertaken to address the above remaining social and environmental issues:

Installation of appropriate silt prevention and protection measures. Appropriate silt prevention measures will be observed to ensure protection of coral reefs and the marine environment. Excavated materials at the beach area should be stockpiled landward or away from the tidal flat. During the October 22 site visit, the Bank Task Team observed that excavated materials were mostly sand and gravel and they were being stockpiled landward beyond the reach of the tides. It was also observed that contractors were installing gabions near the mouth of Bamban River to prevent erosion of the river banks. These are good practices and should be continued throughout the construction phase of the project.

Detailed assessment on green sea turtle. A detailed assessment shall be undertaken by the proponent in coordination with the Department of Environment and Natural Resources (DENR), the Protected Areas and Wildlife Bureau (PAWB) and the Turtle Conservation Society of the Philippines to confirm the presence or absence of the green sea turtle nesting in the wind farm area. This will be carried out during breeding months from March – May 2005. The TOR for the study shall be reviewed by the World Bank for issuance of no objection. Where the assessment confirms the presence of such species, the population status will also be assessed and proper protection, mitigation and conservation measures will be formulated and implemented by the proponent. The study report and corresponding conservation measures shall be submitted to the Bank by July 2005 for review and approval.

Implementation of social development program for the host villages. To formalize its commitment to provide social development program for the host villages, the proponent should formulate a social development plan (SDP) in coordination with the local government. The program shall include a livelihood development component to be implemented through a participatory approach. The program may be financed from a portion of the credit to be derived from the carbon facility. The SDP document shall be submitted to the Bank before the end of the construction activities.

Implementation Arrangements

The proponent will be responsible for carrying out the social and environmental management measures that it has committed to undertake as part of the project. It will also undertake the specific actions identified above to address the remaining social and environmental issues/concerns. The Bank and the proponent will agree on management measures and/or further actions that need to be implemented as well as the indicators through which compliance will be verified by the Bank or by the third party auditors. A matrix of management measures and indicators is indicated below (Table 3). The third party auditor will be tasked to monitor implementation of environmental and social development plans of the proponent while the Bank will also undertake regular supervision of safeguard implementation and compliance. To facilitate compliance monitoring and audit, the proponent will be required to submit semi-annual safeguard compliance report to the Bank.

Table 3. Environmental and Social Management Measures and Indicators

Concern/Issue	Required Measures/Actions	Verifiable Indicators	Timing/Schedule
A. Construction at Wind Farm			
Possible silting of coral reefs	③ Provision of adequate silt barriers/canals around earth excavations and boulders ③ Placement of excavated sands away from the tidal zone	③ Clause in the civil works contracts binding contractors to silt management measures (contract submission to WB) ③ Presence of canals, gabions and silt barriers around the spoils of the construction sites (Construction report with pictures)	③ January 30, 2005 ③ January 30, 2005
Local Employment	③ Priority hiring of local residents	③ Existence of local hiring policy (Report submitted to World Bank) ③ Percent of local residents among workers	③ January 30, 2005
B. Transmission Line			
Possible damage to private properties	③ Adoption of Transco Compensation Guidelines	③ Absence of damage complaints or evidence of compensation	③ Submission of compliance and monitoring report every 6 months
C. Operation of Wind Farm			
Possibility of Green Sea Turtle Nesting	③ Conduct of field-based investigation by a DENR-	③ Green turtle nesting study report	③ March – May 2005 (Study)

Sites	recognized expert and submission of report to the Bank by July 1, 2005 for review and approval. ③ TOR of the study to be reviewed by the Bank for issuance of no objection letter ③ If turtle nesting is confirmed, formulation and adoption of conservation measures	③ If turtle nesting is confirmed, evidences that Bank-approved measures were undertaken.	③ July 1, 2005 (Report) ③ January 31, 2005 (TOR submission to World Bank) ③ Submission of compliance and monitoring report every 6 months
Possible oil and grease contamination of the beach	③ Provision of fail-safe oil and grease equipment ③ Oil and grease monitoring of beach area	③ Absence of oil and grease leaks or spills in the vicinity ③ Oil and grease analysis reports	③ Submission of compliance and monitoring report every 6 months
Possible bird/bat collision	③ Bird kill/collisions surveillance/monitoring	③ Bird kill/collisions surveillance reports	③ Submission of compliance and monitoring report every 6 months
Social Development Program	③ Preparation and submission of Social Development Plan by January 30, 2005 ③ Implementation of the SDP by start of project operation	③ Social Development Plan ③ Social Development Program Report	③ January 30, 2005 ③ Submission of compliance and monitoring report every 6 months

Project Preparation Timeline

Project Schedule	Planned	Actual
PCN review		4/2004
Appraisal		10/2004
Negotiation		10/2004
Board/RVP approval		N.A.
Planned date for effectiveness		1/2005
Planned closing date		12/31/2014

Bank Staff who worked on the project include:

Name	Title	Unit
Selina Shum	Task Team Leader, Lead Financial Analyst	EASEG
Francisco Fernandez-Asin	Sr Financial Specialist	ENVCF
Ernesto Terrado	Consultant, Renewable Energy Specialist	LCSFR
David Olsen	Consultant, Wind Farm Specialist	
Jyoti Bisbey	Operations Analyst	IEF
Josefo Tuyor	Environmental Specialist	EASEN
Emma Serafina Guli	Counsel	LEGCF
Jose T. Nicolas	Social Development Specialist	EASSD
Jonas Bautista	Consultant, Environmental Specialist	
Carla Teresa Sarmiento	Program Assistant	EASEG

TECHNICAL ANNEX 12: DOCUMENTS IN THE PROJECT FILE

1. Project Idea Note (PIN)
2. Project Concept Note (PCN)
3. Letter of Intention
4. Letter of Approval
5. Feasibility Study
6. Environmental Impact Assessment (EIA)
7. Renewable Energy Policy Framework (DOE)
7. Philippine Energy Plan (DOE)

Project Design Document

for

NorthWind Bangui Bay Project – Phase 1

June 2004

Prototype Carbon Fund

Prepared by

Mitsubishi Securities
Clean Energy Finance Committee

CONTENTS

ABBREVIATIONS

DANIDA	Danish International Development Agency
GWh	Gigawatt hour
INEC	Ilocos Norte Electric Cooperative
IPP	Independent Power Producers
MW	Megawatt
NEGM	NEG Micon
NorthWind	NorthWind Power Development
PhilEXIM	Philippine Export and Import
PCF	Prototype Carbon Fund
TRIPOD	Tripod Wind Energy Company

A. General description of project activity

A.1 Title of the project activity:

NorthWind Bangui Bay Project – Phase 1 (the Project)

A.2. Description of the project activity:

(Please include in the description
- the purpose of the project activity
- the view of the project participants of the contribution of the project activity to sustainable development (max. one page).)

The Project is a 24.75 MW wind turbine power plant that is to be located in Bangui Bay, Philippines. The wind-generated electricity produced by the Project is expected to displace grid electricity and achieve GHG reductions of approximately 46,922 tCO_2e (tons of carbon dioxide equivalent) per year for the duration of the project activity. A reduction of approximately 328,454 tCO_2e, generating the equivalent amount of Certified Emission Reductions (CERs), is forecast for the first 7-year crediting period.

The expected load factor for the Projected is 34.4%, resulting in the generation of 74.48 GWh of electricity annually. The Project is to be developed by NorthWind Power and will have an expected minimum plant operating life of 20 years.

The Philippines faced serious power shortages in the early 1990's. The Philippine government, in order to provide reliable power supply to aid sustainable economic growth and development, set about restructuring the power sector. Recently there has been increased attention towards developing environmentally clean and renewable energy. Wind power is included in the 10-year energy plan[1] for the Philippines. This Project represents the first commercial wind power project in the ASEAN region. It will provide zero greenhouse gas (GHG) emission power and help to enhance technology transfer to the Philippines. This is a positive development considering that, as part of the Department of Energy's medium term plan, wind based power is to increase by an average of 40 MW per year or up to 415 MW by 2012.

Employment and job opportunities for locals are expected during the turbine installation phase of the plant and for the duration of its operation. The Project will become an effective transfer medium for wind power technology. Additionally, being the first wind power plant in the ASEAN region, it will also potentially attract an increased number of tourists to the area. This could result in the injection of much needed revenue into local businesses and the local community as a whole.

NorthWind signed a 20-year Electricity Sales Agreement (ESA) with Ilocos Norte Electric Cooperative (INEC) on July 19, 2002. INEC has agreed to purchase all the electricity generated by the Project. This electricity will help to stabilize energy supply in the area.

A.3. Project participants:

[1] Philippine Energy Plan 2004-2013

(Please list Party(ies) and private and/or public entities involved in the project activity and provide contact information in Annex 1.)

(Please indicate at least one of the above as the contact for the CDM project activity.)

Philippines is the party to the proposed project activity. The project participants are listed below:

NorthWind Power Development Corporation (NorthWind)

The project will be implemented by NorthWind. Incorporated as a private company, NorthWind is the owner and operator of power facilities, selling electricity to utilities and/or private entities. The company was established as an alternative for utility operators, and with the aims of addressing the increasing demand for energy. The company combines the expertise of both Philippine and Danish staff who have expensive experience in the field of renewable energy systems. A renowned wind power company, NEG Micon (NEGM)[2], was commissioned to help develop the Project and to supply the equipment. NEGM is also an investor in the Project.

Prototype Carbon Fund (PCF)

The PCF was established by the World Bank in 1999 to promote sustainable development and address global environmental problems through market-based mechanisms. It invests contributions made by both companies and governments to obtain CERs within the framework of the CDM and Joint Implementation (JI). The fund aims to demonstrate how project-based transactions in GHG emissions can contribute to the sustained development of developing countries while helping Annex 1 countries (and their corporations) to meet their GHG emission targets.

PCF is the contact for the Project.

A.4. Technical description of the project activity:

The Project is a 24.75 MW wind turbine power plant that has an expected load factor of 34.4%, resulting in the production of 74.48 GWh of electricity annually. The Project is expected to be operational for a minimum of 20 years.

A.4.1. Location of the project activity:

A.4.1.1 Host country Party(ies):

Philippines

A.4.1.2 Region/State/Province etc.:

Ilocos Norte

A.4.1.3 City/Town/Community etc:

[2] NEG Micon has merged with Vestas Wind Systems A/S.

Bangui Bay, Bangui

A.4.1.4 Detail on physical location, including information allowing the unique identification of this project activity *(max one page)*:

The plant site is situated approximately 460 km north of Manila on the main island of Luzon on the foreshore of Bangui Bay. This area borders the South China Sea and was identified by a governmental study[3] as a good-excellent wind resource for utility-scale applications. The site is located on a strip of cleared land (free of any trees and vegetation) that measures approximately 9 km long by 100 meters wide.

A.4.2. Category(ies) of project activity

(Using the list of categories of project activities and of registered CDM project activities by category available on the UNFCCC CDM web site, please specify the category(ies) of project activities into which this project activity falls. If no suitable category(ies) of project activities can be identified, please suggest a new category(ies) descriptor and its definition, being guided by relevant information on the UNFCCC CDM web site.)

Zero-emissions grid-connected electricity generation from renewable sources

A.4.3. Technology to be employed by the project activity:

(This section should include a description on how environmentally safe and sound technology and know-how to be used is transferred to the host Party, if any.)

NEGM is one of the leading suppliers of wind turbines in the world and has supplied equipment for approximately 20% of the world's wind power capacity. The company specializes in supplying turnkey wind turbine solutions as well as offering project development and execution services, and plant services/maintenance.

The wind turbines to be used in the Project are state-of-the-art models designed, tested and manufactured by NEGM. The Project will have 15 wind turbines (model NM82) that are each rated at 1650 kW. The particular model to be used in the Project was issued a Statement of Compliance by Det Norske Veritas (DNV) on December 1, 2003. The NW 82/1650 Bangui Bay version complies with requirements as outlined in IEC61400-1:1999 and IEC WT01 covering the actual conditions:

V_{e50} of 70m/s
$V_{average}$ of 7.0m/s at 50M
L_{15} of 11% at 50M

[3] The United States National Renewable Energy Laboratory conducted a wind resource analysis and mapping study using geographic Information System (GIS) technology. In this study Ilocos Norte was identified as an area of good-excellent wind resource.

The NM82/1650 turbine is equipped with 3 pitchable blades and mechanical brakes acting on the high-speed side of the gear. Blades and mechanical brakes are driven independently by hydraulics and designed to be fail-safe even if the system is not pressurized.

The Project, being the first wind power plant in the Philippines, will contribute significantly to the country's knowledge base in terms of plant operation. This transfer of technology and expertise from one of the leading wind power generation companies in the world will provide Philippine staff with experience necessary to operate the equipment.

A.4.4. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

(Please explain briefly how anthropogenic greenhouse gas (GHG) emission reductions are to be achieved (detail to be provided in section B.) and provide the total estimate of anticipated reductions in tonnes of CO_2 equivalent as determined in section E. below.)

The Project will generate electricity without emitting GHG. It will reduce anthropogenic GHG emissions by displacing GHGs that are emitted when burning fossil fuels to generate power. The project is projected to reduce 46,922 tCO_2e annually, generating an expected total of just over 328,454 tCO_2e for the duration of the initial 7-year crediting period.

The Project faces a number of barriers that threaten to impede its implementation, most importantly, the high cost of wind power plants compared to conventional power plants. Although the Project will receive financing from Danish International Development Agency (DANIDA), Philippine Export and Import (PhilEXIM) will only act as guarantor on the condition that the Project attains CDM status. Benefits from CER revenues will enable PhilEXIM to offset high project risk. The organization further stipulates that the CERs, when acquired, must be pledged as collateral for its guarantee.

See Section B.4 for detailed discussion on project barriers.

A.4.5. Public funding of the project activity:

(In case public funding from Parties included in Annex I is involved, please provide in Annex 2 information on sources of public funding for the project activity, including an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.)

The Danish government lending organization, DANIDA, with ABN Amro as the lending bank, has loaned the Project 29 million dollars. However, this funding does not result in the diversion of official development assistance and is not related to the financial obligation of Denmark. PhilEXIM guarantees the loan on the condition that the Project attains CDM status. PhilEXIM has stipulated that all resulting CERs are to be used as collateral for its guarantee.

B. Baseline methodology

B.1 Title and reference of the methodology applied to the project activity:

(Please refer to the UNFCCC CDM web site for the title and reference list as well as the details of approved methodologies. If a new baseline methodology is proposed, please fill out Annex 3. Please note that the table "Baseline data" contained in Annex 5 is to be prepared parallel to completing the remainder of this section.)

"Consolidated baseline methodology for zero-emissions grid-connected electricity generation from renewable sources (AM00XX)"

The above methodology is hereafter referred to as the "Baseline Methodology".

B.2. Justification of the choice of the methodology and why it is applicable to the project activity

The Project is a grid-connected zero-emission renewable power generation activity and meets all the following conditions that are stated in the Baseline Methodology (AM00XX):

- The Project supplies electricity capacity addition (24.75 MW) from a wind source;
- The Project is not an activity that involves switching from fossil fuels to renewable energy at the project site;
- It is not a hydro project;
- The electricity grid is clearly identified (as Luzon grid) and information is available on the characteristics of the grid[4];
- There is no electricity exported from the grid and the project is not responsible for any leakage;
- Prohibitive barriers that the Project faces are clearly identified in a transparent and conservative manner. The additionality test below shows data sources for identification of barriers, and demonstrates that the Project is not BAU due to financial risk. It includes a feature for demonstrating that similar projects have not been carried out without CDM assistance. A full barriers analysis has also been completed to demonstrate that the Projects successful implementation is depended on CDM assistance.

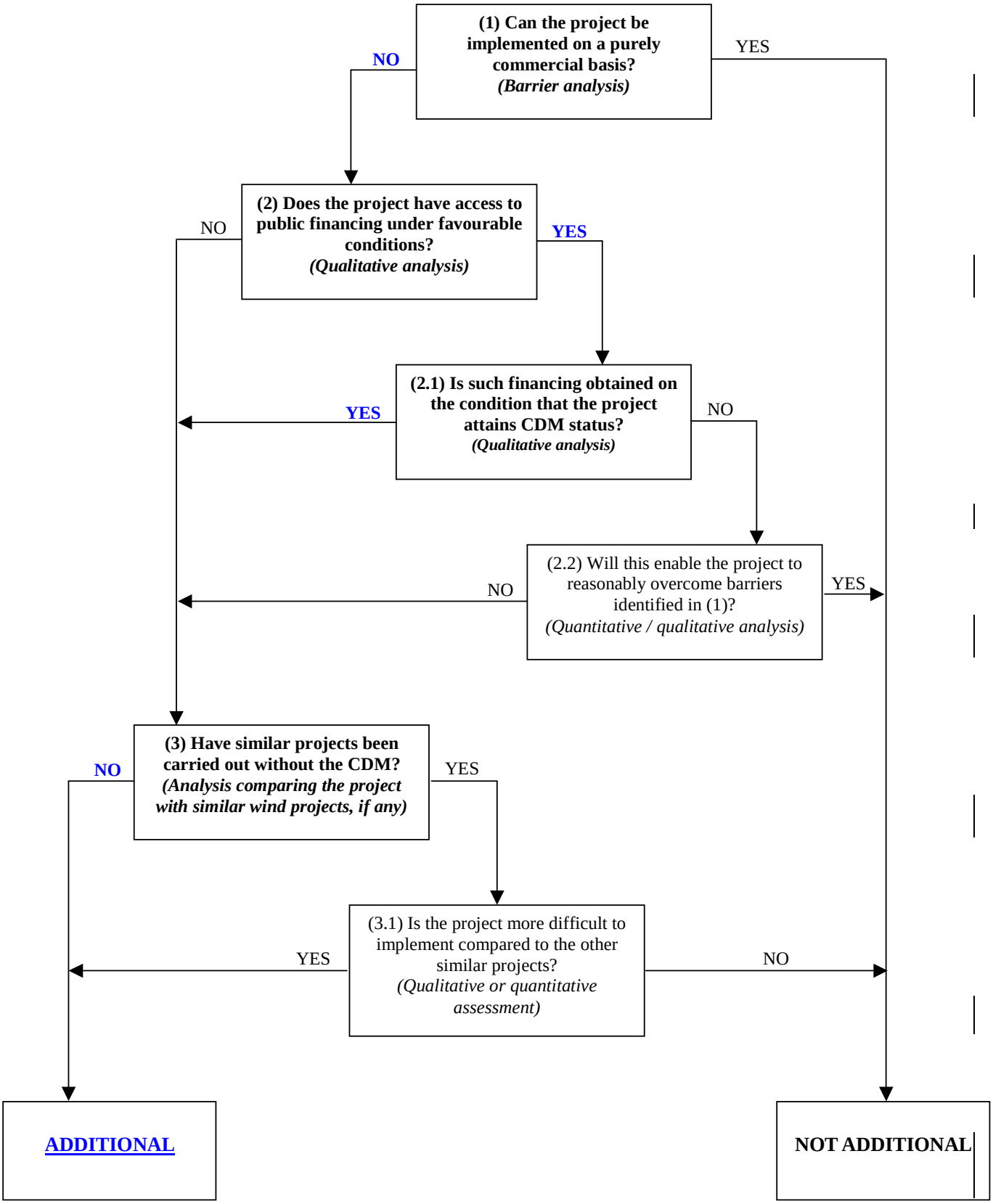
B.3. Description of how the methodology is applied in the context of the project activity:

The additionality test will be completed to demonstrate how the methodology is applied in the context of the project activity.

Additionality Test for the Project[5]

[4] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

[5] Answers to questions marked in blue show the path of the Project.


(1) Can the project be implemented on a purely commercial basis? (Barrier analysis)
NO
YES
(2) Does the project have access to public financing under favourable conditions? (Qualitative analysis)
NO
YES
(2.1) Is such financing obtained on the condition that the project attains CDM status? (Qualitative analysis)
YES
NO
(2.2) Will this enable the project to reasonably overcome barriers identified in (1)? (Quantitative / qualitative analysis)
NO
YES
(3) Have similar projects been carried out without the CDM? (Analysis comparing the project with similar wind projects, if any)
NO
YES
(3.1) Is the project more difficult to implement compared to the other similar projects? (Qualitative or quantitative assessment)
YES
NO
ADDITIONAL
NOT ADDITIONAL

Project additionality

The additionality test is completed to demonstrate that the Project is in fact additional. An objective indicator of the attractiveness of the Project will be provided to the DOE during validation and sufficient information will also be made available to the public.

Step 1: Can the project be implemented on a purely commercial basis?

A ROE analysis is used to demonstrate the presence of barriers. The results from the analysis are compared to the interest rate on Philippine government bonds.

As the following table amply demonstrates, the Project's ROE is very low at only 4.7%, compared to the current interest rate on Philippine Government 20-year Bonds (12.88%), and is too low to be implemented on a purely BAU basis.

ROE analysis for the Project [6]

	Parameters	
A	Capacity	24.75 MW
B	Initial investment	25,000,000
C	Expected load factor	34.4%
D	Project life	20 years
E	Electricity sales per year [7]	2,979,200 (74,480,000 kWh)
		Amount (US$)
	Expenses	
F	EPC cost[8]	1,250,000
G	O & M costs[9]	500000
H	Fuel cost	0
I	Interest[10]	835,000
J=E-(F+G+H+I)	**PROFIT**	394,200
K	Equity[11]	8,300,000
L=J / K	ROE per year (%)	4.7

[6] Where possible, data supplied by NorthWind was used in the ROE calculations. Otherwise, data was sourced from typical industry standards. This ROE analysis does not take public funding into account.

[7] Electricity Regulatory Commission approved NPC wholesale price for the Luzon grid is currently 0.04 US$.

[8] Calculated by dividing the total construction cost for the plant divided by the expected operating life.

[9] 2% of initial investment cost for the Project. O&M costs also include labour cost and administration cost.

[10] A value of 10% was used for the interest rate of the Project (prime bank lending rate currently ranges from 9.2 – 10.0%). The interest cost was calculated by deducting equity from the initial investment then dividing the total by 2 to arrive at the average outstanding balance. This value was then multiplied by the interest rate (10%) to get the average annual interest cost.

[11] A debt/equity ratio of 2:1 was applied to initial investment amount to determine the project equity.

Step 2: Does the project have access to public financing under favourable conditions?

The project has secured funding from DANIDA under favourable conditions.

Step 2.1: Is such financing provided on the condition that the project attains CDM status?

PhilEXIM is the guarantor for the DANIDA financing that has been committed to the Project. The guarantee is provided on the condition that the Project receives CDM status. Official documentation that attests to the above statement will be provided to the DOE during validation.

Step 3: Have similar project been carried out without the CDM?

The project represents the first commercial wind power plant in the Philippines and ASEAN region as a whole. While wind technology may be a proven technology in some countries, a number of factors prevent the commercial implementation of the Project in the Philippines.

Documented evidence needs to be provided at the start of each new crediting period to prove that the Project has not become common practice. The documents will be in the form of diffusion data, etc.

Determining the baseline scenario

In accordance with the Consolidated Methodology, the combined margin (the average of the operating margin and build margin) is deemed to best represent what would happen in the absence of the Project. The baseline scenario is the amount of electricity generation that will be replaced by the Project from the operation of existing grid-connected power plants and by the addition of new power plants. Emissions reductions will be claimed based on total CO_2 emission mitigated by the Project. Although nitrous oxide (N_2O) emission will also be mitigated by the Project, it is not included in the baseline. This approach could be considered conservative.

The Simple Operating Margin[12] method from the consolidated methodology is applicable to the Project and states that low-operating cost/must-run power plants are excluded from baseline calculations. The Simple Operating Margin will reflect the grid situation in Luzon. The operating margin for the Project is the generation-weighted average of all generating sources, excluding hydropower and geothermal power plants. The Luzon grid has a high reliance on fossil fuels with oil-based, coal and natural gas plants making up over 80% of the grid's total installed capacity. These plants are the most likely to be displaced by the Project.

The Build Margin is defined in the consolidated methodology as the generation-weighted average emission factor of a sample of power plants. The build margin is calculated based on the 5 most recent or most recent 20% of power plants built.

The combined margin baseline emission factor is the weighted average of the operating margin emission factor and the build margin emission factor. The weight of the two emission factors is 50%: 50%.

[12] Low cost/must-run resources constitute less than 50% of total grid generation as stipulated by the consolidated methodology (see section E.4 for data and explanation).

B.4. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity ***(i.e. explanation of how and why this project is additional and therefore not the baseline scenario)***

The Project will displace fossil fuel-based electricity generation with a zero GHG emission source of energy. This will result in the annual reduction of 46,922 tCO_2e that would have been emitted had the Project not been developed.

A barrier analysis will be performed to demonstrate that the successful implementation of the project is dependent on CDM assistance.

Barrier analysis

The Project is not feasible without public financing. NorthWind attempted to increase the viability of the Project by securing favourable financing. Public financing with favourable conditions has now been committed by DANIDA on the basis of PhilEXIM guarantee. However, in view of the risks the Project involves, PhilEXIM has only agreed to provide the guarantee on the condition that the Project receives CDM status and that the acquired CERs be pledged as collateral for PhilEXIM. Documentation attesting to this requirement by PhilEXIM will be provided to the DOE during validation.

To aggravate the difficulty, the Project is faced with technological challenges due to the fact that wind power is not a proven technology in the Philippines. The Project will become the first wind farm in the ASEAN region so it is likely that skilled labor will be difficult to source from the local work force. Proper maintenance of the machinery is required to prevent it falling into disrepair and the workers required for this maintenance will need to be trained. Skilled workers from overseas may need to be hired to supervise and train local workers. This could add considerably to the costs associated with the running of the Project.

Mother nature may also be a formable barrier to the Project. The Philippines and surrounding areas are prone to typhoons that generate extremely strong winds. A typhoon could potentially damage the Project's wind power generation equipment. In fact, on the 12th of September 2003[13], typhoon number 14 battered the island of Okinawa, Japan, damaging wind power equipment owned by Okinawa Power. At their facilities in Hirara alone, 2 of the 4 wind turbines were blown down and another lost its blade.

To help cope with the abovementioned problems, NorthWind decided to seek CDM assistance when it started formulating a serious business plan for the Project. After discussions with experts, NorthWind became convinced of the prospects for the Project's CDM status, given the Project's GHG-free power generation and increasingly CDM-friendly policies of the Philippine government.

[13] An article that appeared in the Asahi Newspaper, 12th September 2003

B.5. Description of how the definition of the project boundary related to the baseline methodology is applied to the project activity*:*

As stipulated in the Baseline Methodology, the physical delineation is defined as the plant site. The only gas included in the emission reduction calculation is CO_2.

B.6. Details of baseline development

B.6.1 Date of completing the final draft of this baseline section *(DD/MM/YYYY)*:

XX/XX/2004

B.6.2 Name of person/entity determining the baseline:
(Please provide contact information and indicate if the person/entity is also a project participant listed in Annex 1.)

Clean Energy Finance Committee
Mitsubishi Securities
Tokyo, Japan
Tel: +81-3-6213-6860
E-mail: hatano-junji@mitsubishi-sec.co.jp

Mitsubishi Securities developed the baseline analysis under the guidance of the Prototype Carbon Fund (PCF). The company is not a project participant.

C. Duration of the project activity / Crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

(For a definition by the Executive Board of the term "starting date", please refer to UNFCCC CDM web site. Any such guidance shall be incorporated in subsequent versions of the CDM-PDD. Pending guidance, please indicate how the" starting date" has been defined and applied in the context of this project activity.)

XX/XX/2004

C.1.2. Expected operational lifetime of the project activity: *(in years and months, e.g. two years and four months would be shown as: 2y-4m)*

The project is expected to have a minimum operating lifetime of 20 years.

C.2 Choice of the crediting period and related information: *(Please underline the appropriate option (C.2.1 or C.2.2.) and fill accordingly)*

(Note that the crediting period may only start after the date of registration of the proposed activity as a CDM project activity. In exceptional cases, the starting date of the crediting period can be prior to the date of registration of the project activity as provided for in paras. 12 and 13 of decision 17/CP.7 and through any guidance by the Executive Board, available on the UNFCCC CDM web site)

C.2.1. Renewable crediting period *(at most seven (7) years per period)*

C.2.1.1. Starting date of the first crediting period *(DD/MM/YYYY)*:

XX/XX/2006

The expected date of commissioning is given as the starting date of the first crediting period. Should the plant construction/commissioning be delayed, the starting date of the crediting period will be delayed accordingly.

C.2.1.2. Length of the first crediting period *(in years and months, e.g. two years and four months would be shown as: 2y-4m)*:

Seven (7) years with the option of two renewal periods.

C.2.2. Fixed crediting period *(at most ten (10) years)*:

C.2.2.1. Starting date *(DD/MM/YYYY)*:

C.2.2.2. Length (max 10 years): *(in years and months, e.g. two years and four months would be shown as: 2y-4m)*

D. Monitoring methodology and plan

(The monitoring plan needs to provide detailed information related to the collection and archiving of all relevant data needed to
- estimate or measure emissions occurring within the project boundary;
- determine the baseline; and;
- identify increased emissions outside the project boundary.
The monitoring plan should reflect good monitoring practice appropriate to the type of project activity. Project participants shall implement the registered monitoring plan and provide data, in accordance with the plan, through their monitoring report.

Operational entities will verify that the monitoring methodology and plan have been implemented correctly and check the information in accordance with the provisions on verification. This section shall provide a detailed description of the monitoring plan, including an identification of the data and its quality with regard to accuracy, comparability, completeness and validity, taking into consideration any guidance contained in the methodology.

Please note that data monitored and required for verification and issuance are to be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whatever occurs later.)

D.1. Name and reference of approved methodology applied to the project activity:

(Please refer to the UNFCCC CDM web site for the name and reference as well as details of approved methodologies. If a new methodology is proposed, please fill out Annex 4.)

(If a national or international monitoring standard has to be applied to monitor certain aspects of the project activity, please identify this standard and provide a reference to the source where a detailed description of the standard can be found.)

"Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources (AM00XX)"

The above methodology is hereafter referred to as the "Monitoring Methodology".

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The Project is a grid-connected zero-emission renewable power generation activity and meets all the following conditions that are stated in the consolidated monitoring methodology (AM00XX):

- The Project supplies electricity capacity addition from wind source;
- The Project is not an activity that involves switching from fossil fuels to renewable energy at the project site;
- It is not a hydro project;
- The electricity grid is clearly identified (as Luzon grid) and information is available on the characteristics of the grid[14]
- There is no electricity exported from the grid and the project is not responsible for any leakage;
- Prohibitive barriers that the Project faces have been clearly identified in a transparent and conservative manner, and the Project is not common practice. Data sources relating to the Project are listed in the monitoring methodology and will be made available to the DOE during validation.

The Monitoring Methodology is suitable to this Project and the following variables will be monitored as stipulated by the Monitoring Methodology:

- Electricity generation from the Project (double checking through quality control/assurance procedures).
- The latest Luzon grid data supplied by the Philippine Department of Energy will be utilized for recalculation of the simple operating margin (Simple OM) emission factor on an annual basis.
- The latest available data supplied on the Luzon grid by the Philippine Department of Energy will be used to calculate the build margin (BM) *ex ante*[15].

[14] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

[15] The baseline methodology stipulates that smaller projects (less than 60 MW) can calculate the build margin *ex ante* based on the most recent information available at the time of PDD submission (see section E.4 for further details).

- Monitoring to make sure that the Project is still additional in that barriers still remain and it is still not common practice (quality control/assurance procedures followed).

D.3. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

There are no emissions to be monitored for the project activity.

D.4. Potential sources of emissions which are significant and reasonably attributable to the project activity, but which are not included in the project boundary, and identification if and how data will be collected and archived on these emission sources.

There is no leakage associated with the Project so I.D. numbers 15 and 16 from the Monitoring Methodology are not applicable.

D.5. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHG within the project boundary and identification if and how such data will be collected and archived *(Depending on the methodology used to determine the baseline this table may need to be filled. Please add rows to the table below, as needed.)*

ID number and Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	For which baseline method(s) must this element be included	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	How long is the archived data to be kept?	Comment
1. Electricity	Electricity supplied to the grid by the Project	kWh	m	Simple OM, BM	Hourly measurement and monthly recording	100%	Electronic	Duration of crediting period	Electricity supplied by the project activity to the grid. Double check by receipt of sales.
2. Emission factor	GHG emission factor of the grid	TCO_2eq/kWh	c	Simple OM, BM	Yearly	100%	Electronic	Duration of crediting period	Calculated as a weighted sum of emission factors of Simple OM and BM
3. Emission factor	GHG emission factor of the grid (Simple OM)	TCO_2eq/kWh	c	Simple OM	Yearly	100%	Electronic	Duration of crediting period	Simple OM relevant to the Project
4. Emission factor	GHG emission factor of the grid (BM)	TCO_2eq/kWh	c	BM	Once at the renewal of a crediting period	100%	Electronic	Duration of crediting period	Calculated as defined in the Baseline Methodology for small projects (less than 60 MW)
5. Fuel	Amount of each fossil fuel consumed in each plant type	toe	m	Simple OM, BM	Yearly	100%	Electronic	Duration of crediting period	Latest data obtained from the Philippine Department of Energy
6. CO_2-eq coefficient	CO_2-eq coefficient of each fuel	tC/TJ	-	Simple OM, BM	Yearly	100%	Electronic	Duration of crediting period	IPCC default value used
7.	Electricity	kWh/yr	m	Simple OM,	Yearly	100%	Electronic	Duration	Latest data obtained

Electricity	generation of each plant type			BM				of crediting period	from the Philippine Department of Energy
9. Plant name	Plant identification for BM	Text	e	BM	Yearly	100% of set of plants	Electronic	Duration of crediting period	Identification of plants to calculate BM emission factor
10. Weighting factor	Weight factor of OM/BM	Non-dimensional number	m	CM	At the renewal of a crediting period	100%	Electronic	Duration of crediting period	Default weight factor is 0.5 each. (OM + BM = 1)
11. Barriers	Documented evidence	Test list	e	Simple OM, BM	Once at the renewal of a crediting period	100%	Electronic	Paper for original documents, else electronic	Documented evidence of the prohibitive barriers of the proposed project activity
12. Common practice	Documented evidence	text	e	Simple OM, BM	Once at the renewal of a crediting period	100%	Electronic	Paper for original documents, else electronic	Documented information related to alternatives to the project, especially diffusion data

I.D. numbers 8, 13 and 14 are not applicable to the Project.

D.6. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored. *(data items in tables contained in section D.3., D.4. and D.5 above, as applicable)*

Data	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data	Outline explanation why QA/QC procedures are or are not being planned.
1	Low	Yes	These data will be directly used for calculation of emission reductions. Sales record to the grid and other records are used to ensure consistency.
11,12	Low	No	These data are used to check whether the applicability conditions are met.
Others	Low	Yes	Default data (for emission factors) and IEA statistics (for energy data) are used to check the local data.

D.7 Name of person/entity determining the monitoring methodology:

(Please provide contact information and indicate if the person/entity is also a project participant listed in Annex 1 of this document.)

Clean Energy Finance Committee
Mitsubishi Securities

Tokyo, Japan

Tel: +81-3-6213-6860
E-mail: hatano-junji@mitsubishi-sec.co.jp

Mitsubishi Securities developed the monitoring plan under the guidance of the Prototype Carbon Fund (PCF). The company is not a project participant.

E. Calculation of GHG emissions by sources

E.1 Description of formulae used to estimate anthropogenic emissions by sources of greenhouse gases of the project activity within the project boundary: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The Project shall be responsible for zero GHG emissions. Wind power plants are classed as zero emission projects since there are no associated emissions in the project boundary.

E.2 Description of formulae used to estimate leakage, defined as: the net change of anthropogenic emissions by sources of greenhouse gases which occurs outside the project boundary, and that is measurable and attributable to the project activity: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The Project will not be responsible for any leakage.

E.3 The sum of E.1 and E.2 representing the project activity emissions:

The Project will not be responsible for any project activity emissions. Project activity emissions are zero (0) due to the fact that there are no anthropogenic emissions or leakage.

E.4 Description of formulae used to estimate the anthropogenic emissions by sources of greenhouse gases of the baseline: *(for each gas, source, formulae/algorithm, emissions in units of CO_2 equivalent)*

The Baseline Methodology stipulates that the baseline of the Project is the combined margin (CM), which is the weighted average of the operating margin (OM) and the build margin (BM). The baseline emissions are calculated using the formulas provided the Baseline Methodology. The only GHG included in the baseline calculations is CO_2. This is conservative because N_2O emission is associated with grid electricity generation but not associated with wind power plants.

Although the Baseline Methodology states that it is preferable to obtain plant emission factors directly from dispatch centers or power producers (for each plant), this data is not available in the Philippines. The Philippine power grids are supplied by many IPPs, which makes accurate data collection difficult. However, provisional data is available on the aggregate fuel consumption / electricity generation for each generation type of the Luzon grid, from the Philippine Department of Energy. As stipulated in the Baseline Methodology, default IPCC figures can be used for calorific value and carbon emission factors, for the different fuel types. Thus, the data supplied by the Philippine Department of Energy will be used along with IPCC figures to calculate the OM and BM[16].

The following data will be used in baseline calculations:

Data used to calculate the baseline emissions

	Fuel consumption data (TJ)[17]	**C emission factor (tC/TJ)[18]**	**Fraction of C oxidized[19]**	**Electricity generated[20] (MWh)**
Coal	155,073	26.8	0.98	17,123,000
Natural gas	111,000	15.3	0.995	16,102,000
Petroleum	4,958	21.1	0.99	559,000
Hydro	-	-	-	3,572,000
Geothermal	-	-	-	2,600,000
Total	-	-	-	39,956,000

[17] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

[18] IPCC Reference Manual, Table 1-1.

[19] IPCC Reference Manual, Table 1-6.

[20] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

The latest available provisional data has been used in the following calculations. In accordance with the Baseline Methodology, in the event that new data is released prior to registration, the baseline emissions will be recalculated.

Baseline emissions will be calculated for the Project in accordance with the Baseline Methodology. A 4-step process is used:

STEP 1 - Calculate the OM emission factor
STEP 2 – Calculate the BM emission factor
STEP 3 – Calculate the CM emission factor
STEP 4 – Calculate baseline emission reductions

STEP 1 - Calculate the OM emission factor

The Simple OM method (method a) from the Baseline Methodology was selected to calculate the OM. This methodology is applicable to the Project because low cost/must run resources constitute less than 50% of the total grid generation. In fact, as can be seen from the below table, in 2003 low cost/must run resources only constitute 15% of the Luzon grid.

Grid statistics for Luzon grid in 2003[25]

Grid		**Luzon**
Plant type (generation based - %)	Coal	42.9%
	Natural gas	40.3%
	Oil	1.4%
	Hydro	8.9%
	Geothermal	6.5%
Total		100%

The Simple OM is defined as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost/ must-run power plants.

The calculation for CO_2 emission for coal (tCO_2) appears below. The calculated value below is the total grid CO_2 emission from coal for the Luzon grid.

CO_2 emission for coal (tCO_2/yr)	=	Fuel consumption (TJ/yr)	x	C emission factor (tC/TJ)	x	Fraction of C oxidised	x	Mass conversion factor (tCO_2/tC) 44/12
	=	155073 (TJ/yr)	x	26.8 (tC/TJ)	x	0.98	x	44/12 (tCO_2/tC)
CO_2 emission for coal	=	14,933,737	tCO_2/yr					

The above calculation is repeated to obtain the CO_2 emissions (tCO_2/yr) for natural gas and petroleum.

The emission values for coal, natural gas and petroleum have been tallied to get the total amount of CO_2 emissions for the Luzon grid for 2003.

The total amount of CO_2 emission is divided by the total electricity generated from fossil fuelled plants to calculate the Simple OM emission factor.

Simple OM emission (tCO_2/yr)	=	Total CO_2 emissions tCO_2/yr	/	Total electricity generated from fossil fuelled plants MWh
	=	21,509,419 tCO_2/yr	/	33,784,000 MWh

Simple OM emission factor	=	0.64	tCO_2/MWh

STEP 2 – Calculate the BM emission factor[21]

The BM emission factor is defined as the generation-weighted average emission factor of either the 5 most recent plants or the most recent 20% of power plants built, whichever group's average annual generation capacity is greater. Although the methodology stipulates that annual generation capacity is to be expressed in MWh, such data is not available for individual plants on the Luzon grid. The data available only details the installed capacity (MW) of each plant. However, utilizing the available data, the weighted average on a generation capacity (MW) basis can be calculated, and by using the calculated emission factors from simple OM calculations, BM emission factor for the grid can be derived.

Simple OM emission factor for plants connected to Luzon grid

PLANT TYPE	Simple OM emission factor (tCO_2/MWh)
Coal	0.87
Natural gas	0.38
Oil	0.68

The sample group; either "the 5 most recent power plants" or "Most recent 20% of power plants", is chosen based on whichever group's average generation capacity (MW) is greater.

The five most recent power plants

Year	Plant Name	Plant Type	Installed Capacity (MW)
2002	Ilijan Nat Gas	Natural gas	1200
2001	Casecnan	Hydro	140
2001	Bakun A/C	Hydro	70
1999	Sual Coal Unit 1-2	Coal	1000
1998	Masinloc coal 1&2	Coal	600
		TOTAL	3010

[21] According to the Baseline Methodology, projects less than 60 MW in size may calculate build margin *ex ante* based on the most recent information available at the time of PDD submission. This approach has been adopted for the Project.

Most recent 20% of power plants[22]

Year	Plant Name	Plant Type	Installed Capacity (MW)
2002	Ilijan Nat Gas	Natural gas	1200
2001	Casecnan	Hydro	140
2001	Bakun A/C	Hydro	70
1999	Sual Coal Unit 1-2	Coal	1000
		TOTAL	2410

The total installed capacity of the sample group for the five most recent power plants is greater than that of the most recent 20% of power plants. The calculations for the former are summarised in the table below:

Calculations for BM emission factor

Plant Type	Installed capacity (MW)	Simple OM emission factor (tCO_2/MWh)	Weighted BM emission factor (tCO_2/MWh)
Coal	1600	0.87	0.464
Natural gas	1200	0.38	0.153
Oil	0	0.68	-
Hydro	210	0.00	0
Geothermal	0	0.00	-
TOTAL	3010		**0.62**

STEP 3 – Calculate the CM emission factor

The Baseline Methodology stipulates that the CM is the weighted average of the OM emission factor (50%) and the BM emission factor (50%).

CM emission factor = (OM emission factor + BM emission factor) / 2

tCO_2/MWh

= (0.64 + 0.62) / 2

CM emission factor = 0.63 tCO_2/MWh

STEP 4 - Calculate baseline emissions reductions

Lastly, the baseline emission (the CO_2 displaced by the project) is calculated.

[22] Based on the power plants in the top 20% of the total grid's combined generation capacity (MW).

CO_2 emission (tCO_2/yr)	=	Electricity produced by the Project (MWh)/yr	x	CM emission factor (tCO_2/MWh)
	=	74,480	x	0.63
	=	**46,922**		**tCO_2/yr**

E.5 Difference between E.4 and E.3 representing the emission reductions of the project activity:

The emission reduction of the project is equal to baseline emission because the Project itself does not produce any emissions.

E.6 Table providing values obtained when applying formulae above:

Emission reductions of the Project activity for the first crediting period

Year	Total baseline emissions (tCO_2e)	Total Project emissions (tCo2e)	Emission reductions (tCO_2e)
2005	46,922	0	46,922
2006	46,922	0	46,922
2007	46,922	0	46,922
2008	46,922	0	46,922
2009	46,922	0	46,922
2010	46,922	0	46,922
2011	46,922	0	46,922
TOTAL	328,454	0	328,454

F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts
(Please attach the documentation to the CDM-PDD.)

An Environmental Impact Assessment Study has been completed and the Philippine Department of Environment and Natural Resources have issued an Environmental Clearance Certificate.

F.2. If impacts are considered significant by the project participants or the host Party: *please provide conclusions and all references to support documentation of an environmental impact assessment that has been undertaken in accordance with the procedures as required by the host Party.*

The project participants and the host party expect environmental impacts to be minimal.

G. Stakeholders comments

G.1. Brief description of the process on how comments by local stakeholders have been invited and compiled:

The Project has undergone public hearing with concerned stakeholders. As a result, the Project has been issued resolution for it to go ahead.

G.2. Summary of the comments received:

G.3. Report on how due account was taken of any comments received:

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Represented by:	
Title:	
Salutation:	
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Middle Name:	
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Personal E-Mail:	

Organization:	Prototype Carbon Fund
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Annex 3

NEW BASELINE METHODOLOGY

Not applicable

ANNEX 4

NEW MONITORING METHODOLOGY

Not applicable

ANNEX 5

TABLE: BASELINE DATA

(Please provide a table containing the key elements used to determine the baseline (variables, parameters, data sources etc.). For approved methodologies you may find a draft table on the UNFCCC CDM web site. For new methodologies, no predefined table structure is provided.)

Data Sources and Values Used to Calculate the Baseline CO_2 Emissions

	Fuel consumption data (TJ)[23]	C emission factor (tC/TJ)[24]	Fraction of C oxidized[25]	Electricity generated[26] (MWh)
Coal	155,073	26.8	0.98	17,123,000
Natural gas	111,000	15.3	0.995	16,102,000
Petroleum	4,958	21.1	0.99	559,000
Hydro	-	-	-	3,572,000
Geothermal	-	-	-	2,600,000
Total	-	-	-	39,956,000

[23] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

[24] IPCC Reference Manual, Table 1-1.

[25] IPCC Reference Manual, Table 1-6.

[26] Data sourced from the Philippine Department of Energy, Philippine Energy Plan 2004-2013.

TECHNICAL ANNEX 14: STATEMENT OF LOANS AND CREDITS

Philippines
(October 31, 2004)

			Original Amount in US$ Millions					Difference between expected and actual disbursements	
Project ID	**FY**	**Project Name**	**IBRD**	**IDA**	**GEF**	**Cancel.**	**Undisb.**	**Orig.**	**Frm Rev'd**
P066076	2004	PH - Judicial Reform Support Project	21.90	0.00	0.00	0.00	21.01	-0.89	0.00
P070899	2004	PH - Laguna de Bay Institutional Strengthening	5.00	0.00	0.00	0.00	4.95	-0.05	0.00
P072096	2004	PH - GEF-Rural Power Project	0.00	0.00	9.00	0.00	8.75	0.05	0.00
P066397	2004	PH - Rural Power Project	10.00	0.00	0.00	0.00	10.56	0.19	0.00
P075184	2004	PH - Diversified Farm Income & Mkt. Devt	60.00	0.00	0.00	0.00	59.30	0.00	0.00
P073488	2003	PH - ARMM Social Fund	33.60	0.00	0.00	0.00	30.32	10.17	0.00
P077012	2003	PH - Kalahi-CIDSS Project	100.00	0.00	0.00	0.00	87.21	16.87	0.00
P071007	2003	PH - Second Agrarian Reform Communities Dev	50.00	0.00	0.00	0.00	47.52	15.08	0.00
P069916	2002	PH - 2nd Social Expenditure Management	100.00	0.00	0.00	0.00	43.86	-8.14	0.00
P069491	2002	PH - LGU Urban Water APL2	30.00	0.00	0.00	0.00	32.08	14.84	0.00
P066069	2001	PH - Land Admin & Management	4.79	0.00	0.00	0.08	1.39	1.48	0.00
P066509	2001	PH - GEF-MMURTRIP-Bicycle Network	0.00	0.00	1.30	0.00	0.95	0.36	0.00
P057731	2001	PH-Metro Manila Urban Trans. (MMUTRIP)	60.00	0.00	0.00	0.00	51.60	35.80	0.00
P059933	2000	PH - Coastal Marine	0.00	0.00	1.25	0.00	0.59	0.95	0.05
P058842	2000	PH - Mindanao Rural Development	27.50	0.00	0.00	6.96	1.24	8.19	2.69
P039019	2000	PH-First Nat'l Rds Improve.	150.00	0.00	0.00	0.00	72.67	72.67	0.00
P048588	1999	PH - LGU Finance & Development	100.00	0.00	0.00	40.00	42.04	63.24	15.60
P057598	1999	PH - Rural Finance III	150.00	0.00	0.00	0.00	42.76	42.76	0.00
P004595	1998	PH - Community Based RESO	50.00	0.00	0.00	12.00	14.06	26.06	14.06
P004566	1998	PH - Early Child Development	19.00	0.00	0.00	0.00	2.46	2.46	-0.64
P004576	1998	PH - Water Districts Development	38.60	0.00	0.00	10.73	12.33	41.27	3.33
P004613	1997	PH - Water Resources Development	58.00	0.00	0.00	16.27	4.23	20.50	1.33
P004602	1997	PH - Third Elementary Education	113.40	0.00	0.00	20.10	25.54	45.64	25.54
P004611	1996	PH - Manila Sewerage II	57.00	0.00	0.00	20.90	11.30	32.20	10.00
P004406	1995	PH - ODS Investment Project	0.00	0.00	30.00	0.00	16.58	1.63	-6.17
		Total	**1,238.79**	**0.00**	**41.55**	**127.04**	**645.28**	**442.61**	**65.79**

Philippines
STATEMENT OF IFC's
Held and Disbursed Portfolio
October 31, 2004
(In US Dollars Millions)

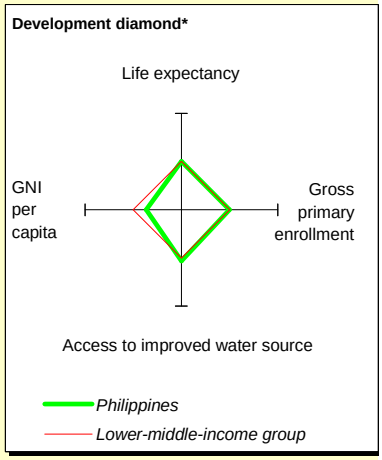
			Held				Disbursed			
FY Approval		Company	Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
	2001	AEI	1	0	0	0	0.75	0	0	0
2001/02		APW Trade	0	0	0.66	0	0	0	0.66	0
		Alaska Milk	0	0.62	0	0	0	0.62	0	0
	2000	Asian Hospital	7	0	0	0	5	0	0	0
	2002	Banco de Oro	20	0	20	0	0	0	20	0
	1998	Drysdale Food	8.97	0	0	5.13	8.97	0	0	5.13
	2002	Eastwood	20	0	0	0	20	0	0	0
	2001	Filinvest	20.93	0	0	0	14.93	0	0	0
	2004	Globe Telecom	20	0	0	0	0	0	0	0
	1998	H&Q PV III	0	5.76	0	0	0	5.76	0	0
	1989	H&QPV-I	0	0.59	0	0	0	0.59	0	0
	1993	H&QPV-II	0	1.11	0	0	0	1.11	0	0
	1992	Holcim Phil	0	5.63	0	0	0	5.63	0	0
	2004	LARES	22	2.7	0	0	0	0	0	0
	2000	MFI MEP	0	0.12	0	0	0	0.12	0	0
	2001	MNTC	46	0	0	0	34.76	0	0	0
2003/04		MWC	30	14.96	0	0	0	14.96	0	0
	2000	Mariwasa	11.8	0	3.12	0	11.8	0	3.12	0
	1993	Mindanao Power	0	4.26	0	0	0	4.26	0	0
	1993	Mirant Pagbilao	15	10	0	0	15	10	0	0
	2001	PEDF	1.5	0	0	0	0.75	0	0	0
	2002	PSMT Philippines	2.3	0	0	0	0	0	0	0
	1992	Pilipinas Shell	0	1.56	0	0	0	1.56	0	0
	2000	PlantersBank	0	0	8.71	0	0	0	8.71	0
	1998	Pryce Gases	13	0	0	5	13	0	0	5
	2000	STRADCOM	11.99	0	8	0	9.59	0	8	0
	2003	SVI	0	4	0	0	0	2	0	0
	1995	Sual Power	22.75	17.5	0	68.92	22.75	17.5	0	68.92
	1994	Walden Mgmt	0	0.05	0	0	0	0.05	0	0
	1994	Walden Ventures	0	0.58	0	0	0	0.58	0	0
		Total Portfolio:	274.24	69.44	40.49	79.05	157.3	64.74	40.49	79.05

Approvals Pending Commitment

		Loan	Equity	Quasi	Partic
2004	Coastal Road	15	0	15	40
2002	Eastwood	0	3	0	0
2001	PEDF	4.5	0	0	0
2005	PLGIC	0	0	1.5	0
2002	S&R Price	0	0	0	0
Total Pending Commitment:		19.5	3	16.5	40

TECHNICAL ANNEX 15: COUNTRY AT A GLANCE

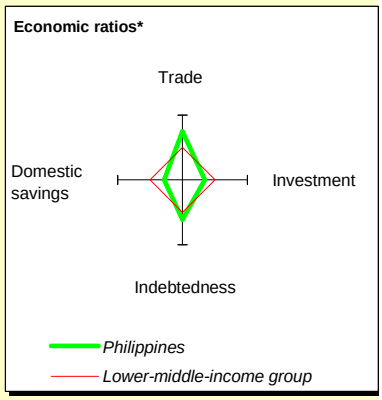
POVERTY and SOCIAL	Philippines	East Asia & Pacific	Lower-middle-income
2003			
Population, mid-year *(millions)*	81.5	1,855	2,655
GNI per capita *(Atlas method, US$)*	1,080	1,080	1,480
GNI *(Atlas method, US$ billions)*	88.0	2,011	3,934
Average annual growth, 1997-03			
Population *(%)*	2.2	1.0	0.9
Labor force *(%)*	2.8	1.1	1.2
Most recent estimate (latest year available, 1997-03)			
Poverty *(% of population below national poverty line)*	37	..	..
Urban population *(% of total population)*	61	40	50
Life expectancy at birth *(years)*	70	69	69
Infant mortality *(per 1,000 live births)*	28	32	32
Child malnutrition *(% of children under 5)*	32	15	11
Access to an improved water source *(% of population)*	86	76	81
Illiteracy *(% of population age 15+)*	7	10	10
Gross primary enrollment *(% of school-age population)*	112	111	112
Male	113	112	113
Female	111	111	111



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

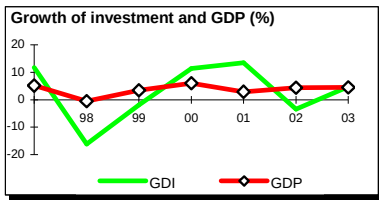
	1983	1993	2002	2003
GDP *(US$ billions)*	33.3	54.4	78.0	80.6
Gross domestic investment/GDP	29.6	24.0	19.3	18.7
Exports of goods and services/GDP	21.6	31.4	48.9	48.3
Gross domestic savings/GDP	23.1	15.5	18.8	16.2
Gross national savings/GDP	..	18.6	26.1	26.8
Current account balance/GDP	-8.3	-5.5	5.4	2.5
Interest payments/GDP	2.8	3.3	3.6	..
Total debt/GDP	72.8	66.5	76.1	..
Total debt service/exports	36.4	25.6	20.2	..
Present value of debt/GDP	..	..	78.6	..
Present value of debt/exports	..	..	134.6	..

	1983-93	1993-03	2002	2003	2003-07
(average annual growth)					
GDP	2.1	3.9	4.4	4.5	4.2
GDP per capita	-0.3	1.6	2.3	2.5	2.2
Exports of goods and services	6.0	4.8	3.6	3.3	5.9

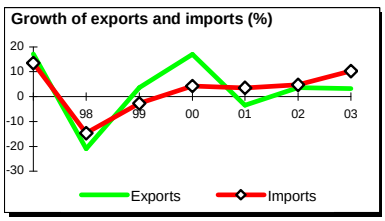


STRUCTURE of the ECONOMY

	1983	1993	2002	2003
(% of GDP)				
Agriculture	22.4	21.6	14.7	14.5
Industry	39.2	32.7	32.5	32.3
Manufacturing	24.2	23.7	22.8	22.9
Services	38.4	45.7	52.8	53.2
Private consumption	68.6	74.4	69.1	72.3
General government consumption	8.3	10.1	12.1	11.4
Imports of goods and services	28.1	39.8	49.4	50.7



	1983-93	1993-03	2002	2003
(average annual growth)				
Agriculture	1.8	2.3	3.3	3.9
Industry	1.0	3.8	3.7	3.0
Manufacturing	1.9	3.5	3.5	4.2
Services	3.4	4.7	5.4	5.9
Private consumption	3.4	4.0	7.9	9.5
General government consumption	2.9	2.6	2.4	-2.8
Gross domestic investment	2.8	3.4	-3.5	4.8
Imports of goods and services	9.1	4.4	4.7	10.3



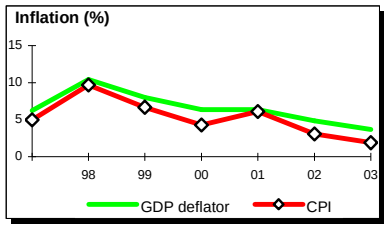
Note: 2003 data are preliminary estimates.

This table was produced from the Development Economics central database.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

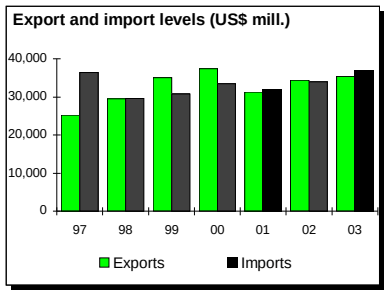
PRICES and GOVERNMENT FINANCE

	1983	1993	2002	2003
Domestic prices				
(% change)				
Consumer prices	..	7.6	3.1	1.9
Implicit GDP deflator	14.2	6.8	4.9	3.7
Government finance				
(% of GDP, includes current grants)				
Current revenue	..	17.7	14.1	14.0
Current budget balance	..	2.3	-5.2	-1.3
Overall surplus/deficit	..	..	-5.2	-4.6



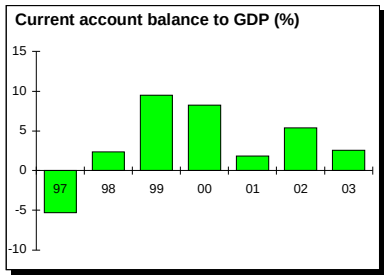
TRADE

	1983	1993	2002	2003
(US$ millions)				
Total exports (fob)	..	11,375	34,383	35,414
Electronics/Telecom	..	3,551	18,583	19,053
Garments	..	2,272	2,391	2,348
Manufactures	..	8,729	31,181	1,252
Total imports (cif)	..	17,597	33,975	36,972
Food	..	714	1,384	2,378
Fuel and energy	..	2,016	3,273	3,899
Capital goods	..	5,610	13,532	12,889
Export price index *(1995=100)*	..	..	..	..
Import price index *(1995=100)*	..	..	..	..
Terms of trade *(1995=100)*	..	..	..	..



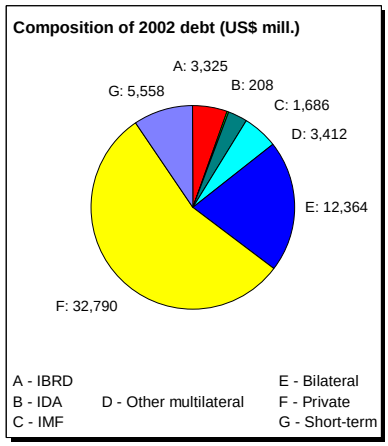
BALANCE of PAYMENTS

	1983	1993	2002	2003
(US$ millions)				
Exports of goods and services	6,813	16,048	37,439	41,604
Imports of goods and services	9,197	20,700	38,295	43,659
Resource balance	-2,384	-4,652	-856	-2,055
Net income	-859	937	4,550	1,660
Net current transfers	472	699	503	2,445
Current account balance	-2,771	-3,016	4,197	2,050
Financing items (net)	-725	2,850	-4,857	-1,601
Changes in net reserves	3,496	166	660	-449
Memo:				
Reserves including gold *(US$ millions)*	..	5,922	16,180	16,115
Conversion rate *(DEC, local/US$)*	11.1	27.1	51.6	54.1



EXTERNAL DEBT and RESOURCE FLOWS

	1983	1993	2002	2003
(US$ millions)				
Total debt outstanding and disbursed	24,211	36,135	59,343	..
IBRD	2,048	4,598	3,325	..
IDA	61	167	208	..
Total debt service	3,028	4,920	9,192	..
IBRD	205	669	480	..
IDA	1	3	7	..
Composition of net resource flows				
Official grants	83	270	178	..
Official creditors	1,015	964	-32	..
Private creditors	769	584	2,027	..
Foreign direct investment	105	1,238	1,111	..
Portfolio equity	0	0	410	..
World Bank program				
Commitments	369	428	200	..
Disbursements	613	673	178	..
Principal repayments	72	340	327	..
Net flows	541	333	-149	..
Interest payments	133	332	159	..
Net transfers	407	1	-308	..



Note: This table was produced from the Development Economics central database. 9/16/04