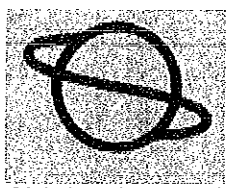
Government of Pakistan

United Nations Development Programme
Global Environment Facility
(PIMS # 624)

Sustainable Development of Utility Scale Wind Power Production


Global Environmental Facility (GEF)

Pakisstan


Ministry of Environment

Signature Page

UNDAF Outcome(s)/Indicator(s): *(Link to UNDAF outcome., If no UNDAF, leave blank)*	*Outcome:* Improved living condition through environmental management and sustainable development *Indicator(s):* Policy guidelines, regulatory frameworks and technical standards developed; improvement in environment conditions and access with reference to safe water, forest cover, biodiversity and renewable energy.
Expected Outcome(s)/Indicator (s): *(CP outcomes linked t the SRF/MYFF goal and service line)*	*Outcome:* A comprehensive approach integrating environmentally sustainable development, global environmental concerns, and commitments in national development planning, with emphasis on poverty reduction and with quality gender analysis *Indicator:* Zero increase in CO_2 emissions
Expected Output(s)/Indicator(s): *(CP outcomes linked t the SRF/MYFF goal and service line)*	*Output:* Commitments under global convention on climate change implemented, *Indicator:* Progress on meeting international commitments
	Output: Clean energy technologies introduced *Indicator:* Percentage of energy demand being met from renewables
Implementing partner: *(designated institution/Executing agency)*	Alternate Energy Development Board (AEDB), Government of Pakistan
Other Partners: *(formerly implementing agencies)*	Ministry of Environment (MoE), Private Power and Infrastructure Board (PPIB), Pakistan Council for Renewable Energy Technologies (PCRET), Pakistan Water and Power Development Authority (WAPDA)

Programme Period: 2004-08
Programme Component: Energy and Environment for Sustainable development
Project Title: Sustainable Development of Utility Scale Wind Power Production – Phase I
Project ID: 1260 (GEF); 624 (PIMS)
Project Duration:2005-2006
Management Arrangement: NEX

Budget	US$ 3,820,000
General Management Support Fee (To be paid as part of the IA fee)	
Total budget:	US$ 3,820,000
Allocated resources:	
• Other:	
○ GEF	US $ 3,100,000
• Government (in kind contributions)	US $ 720,000
Unfunded budget:	Nil

Agreed by the Government of Pakistan: 29.12.2005

AMIR TARIQ ZAMAN
Joint Secretary
Economic Affairs Division
Government of Pakistan
Islamabad

Agreed by the Executing agency:

Air Marshal (R) Shahid Hamid
Chairman
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Prime Minister's Secretariat
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Agreed by UNDP:

United Nations Development Programme
Islamabad

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Resident Representative

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Section I: Elaboration of the narrative

Part I - Situation Analysis

1. Pakistan's commitment to addressing environmental concerns, specifically in relation to climate change, is well documented. The country ratified the UN Framework Convention on Climate Change on June 1, 1994 and the Government of Pakistan (GoP) has also agreed in principle to ratify the Kyoto Protocol.

2. Under the National Conservation Strategy (NCS) devised in 1992, Pakistan has highlighted the importance of renewable energy as an important element of its sustainable development objectives and adopted it as one of the fourteen core areas of implementation. Despite the recognition of renewable energy as a vital source to tap into, the share of renewable energy in the energy mix has been quite negligible. During 2002-2003, the share of various primary energy sources in energy supply mix was: gas 43.8%, oil: 38.3%,LPG:0.4%, coal:5.4%,hydroelectricity:11.3% and nuclear energy:0.9%[1]. However, it is an encouraging sign that the importance of renewable energy is recognized by the Ministry of Petroleum and Natural resources, as well, in their regular publication, Pakistan Energy Yearbook, which has a separate section dedicated to Renewable Energy outlining all development efforts in the field. According to the findings of the PDF "B" study[2] given in 'Identification of Existing Barriers to Wind Energy Use (HBP Ref. R3BA1WEP)" the single most compelling challenge impeding mainstreaming renewable energy is a lack of clear direction backed by policy reform.

3. Pakistan has also undertaken a comprehensive inventory of GHG emission sources and sinks, as well as prioritized feasible mitigation options and formulated a GHG abatement strategy under the GEF/UNDP Asia Least Cost Greenhouse Gas Abatement Strategy (ALGAS) completed in 1997. The country has since updated the national GHG inventory and defined its strategy for addressing climate change concerns through the development of an Initial National Communication to the UNFCCC. The GoP has reaffirmed its commitment to meeting the objectives of the Rio conventions at the World Summit on Sustainable Development held in Johannesburg in 2002. The GoP's 2002 Policy for Power Generation Projects states the safeguarding of the environment and ensuring exploitation of indigenous resources, which include renewable energy resources, as one of its main objectives, along with encouraging greater private sector participation in power generation. Further details on the status of overall power sector and renewables is available in the Financial and Economic Analysis Study conducted under the PDF-B grant funding from UNDP and GEF.

4. To assist the Government of Pakistan in meeting the global targets of Millennium Development Goals (MDGs), the United Nations Development Assistance Framework

[1] HDIP, 2003, Pakistan Energy Yearbook 2003, Ministry of Petroleum and Natural resources, Government of Pakistan

[2] General link to PDFB Studies - http://www.un.org.pk/undp/energy/ongoing-proj.html#5th

for Pakistan has been adopted as a response to national challenges as identified in the Common Country Assessment (CCA). The project is inline with UNDAF area of cooperation on environment to initiate actions and programmes to enhance quality of life of the people, promote sustainable livelihoods and safeguard public health. These actions include support to revise regulatory frameworks and mechanisms, institutional strengthening, ecosystems management and **promotion of sustainable energy sources**.

5. UNDP under the Country Programme (2004-2008) focuses on policy reforms for providing necessary conditions to meet the commitments under the global conventions including UNFCCC. To contribute towards the achievement of the UNDAF outcome for the environment the Country Programme supports the implementation of the National Environment Action Plan (NEAP). NEAP places a particular focus on clean air as a program objective, and seeks to find cleaner alternatives to fossil fuel based thermal power generation, including wind and solar energy. Under the UNDP-funded NEAP Support Programme (NEAP-SP), assistance for the development of renewable energy resources has been specifically pledged under one of the six program objectives to help redress past failures in achieving significant progress.

Part II - Strategy

6. The project would contribute to the government's current economic policies on reducing poverty aimed at increasing employment, enhancing social development, and improving living standards. Rural electrification and infrastructure development, which this project aims to facilitate, are a key area of intervention under these policies.
7. This project will target to reduce GHGs emission in the energy sector and will trigger at least a total of 60 to 80 MW of commercial wind energy installations, thus resulting in a total of 9 million tons of CO_2 reductions over a 20-year time horizon. Furthermore it is expected that the project will contribute to the establishment of a fully adapted enabling framework for grid-connected wind energy (and other grid-connected renewable technologies) in the country, so as to open the opportunity for more massive replication in different promising regions of Pakistan.
8. Under the broader umbrella of UNDAF and Country Programme the project would help in overcoming the policy, institutional and technical barriers for establishing an enabling environment for private sector investment in renewable, particularly, wind power. UNDP with its on-going involvement in the environmental capacity building and climate change programs in Pakistan would closely interact with the key government and non-government stakeholders to ascertain that essential policy and institutional mechanism are in place that promote development of wind power generation at the national level. An emphasis on policy development for creating an enabling environment for such a project is deemed necessary for long-term sustainability through reliability by providing across the board incentives and clear directions. Please see relevant sections in the executive summary (section IV) for details.
9. The project will be implemented using a phased approach where phase 1 (2 years) will focus on removing barriers linked to a currently weak or non existent enabling

environment for on grid renewable energy and specifically for wind energy, together with creating government, private sector and academic awareness and capabilities so as to facilitate its effective commercial deployment throughout the country. To ensure that the desired results are achieved it would be important to keep track of the necessary milestones at the initial, intermediate and long-term time frames. At the initial level, encompassing the Phase I of the project activities, the milestones would be the adoption of wind energy policy and fiscal regime by the government, enunciation of applicable power tariff and final siting of the wind farm based on additional wind resource data. The "go-no go" decision for setting up of the actual wind farm would be taken upon successfully achieving the initial milestones, but to proceed with the phase II further milestones would be required, including, solicitation, evaluation and award of bids, determination of power purchase and grid interconnection arrangements and agreements on financing arrangement for the actual setting up of the wind farm. The long-term milestone would be to have created the enabling environment for the promotion of wind energy/ renewable in the country.

10. Towards the end of phase 1 the project will also start the required steps of a procurement process (expression of interest) related to piloting the first commercial on grid wind energy installation/s[3] in Pakistan. This barrier removing exercise will then create the necessary conditions for phase 2 (3 years) to be presented to the GEF for final approval with adjusted and confirmed estimates of funding from different sources and the conditions attached. Phase 2 will then consist of the initial implementation of the specific enabling environment including contractual and financial conditions to sustain the first commercial on grid wind energy operations on a continued basis. Further details on strategy can be seen under the relevant headings of the GEF Executive Summary (Section IV).

Part III - Management Arrangements

11. Taking into consideration the national level capacities[4] it is obvious that a mix of government agencies would be required to perform and to coordinate the tasks necessary for the implementation of the project. The basic criteria set for proposing suitable agencies is:

    a) Institutional mandate with the drive and capacities within the institutions to objectively deliver on the mandate

    b) Capacity to forge meaningful partnerships with other government agencies

    c) Capacity for dialogue and negotiation on policy issues

[3] Initially the PDFB background studies and the design was based upon one specific project site, Pasni in Balochistan and the estimated costs figures for phase 2 mentioned in this document still correspond to this assumption. However after review by the external STAP expert and the GEF secretariat, it was agreed to leave phase 2 open to different sites and let the details of the procurement process be decided towards the end of phase 1 when we will have the information on what will constitute the package of incentives, tariffs, contracts e.g. that the GOP with targeted GEF support can offer to these first commercial on-grid projects.

[4] Identification of Existing Barriers to Wind Energy Use, HBPR3BA1WEP, 2003.

d) Location within the government vis- a-vis fulfilment of international obligations related to environment.

12. The detailed assessment is given in the background study carried out during the PDF phase on "Identification of existing barriers to Wind Energy Use". Some of the salient features of the various agencies having to play a key role in the implementation of the project are outlined in the following paragraphs.

13. Ministry of Environment (MoE): The Ministry of Environment is the national focal agency for Global Environment Facility (GEF). The Ministry is also responsible for the execution of the National Environmental Action Plan Support Programme, which includes renewables as one of its six sub-programmes. On behalf of the GOP, the Ministry is responsible for coordination with the UNFCCC Secretariat and for ensuring that the country meets its obligations for greenhouse gas mitigation and abatement under the Convention. The Ministry is expected to coordinate country actions under the Clean Development Mechanism (CDM), as and when the facility is implemented. MoE would assume the overall responsibility of developing standards and responsibilities for EIAs to assess the suitability of private investors interested in establishing wind farm(s) during the Phase II of the project. The establishment of EIA criteria would be finalized during the Phase I of the project and form part of the milestones to be reached before embarking on the second phase of the project.

14. Alternate Energy Development Board (AEDB): The recently established Board is to act as a central agency for development of policies relating to alternative and renewable energy technologies including development of such technologies in Pakistan. The board is further assigned with the responsibility of policy and project formulation and interaction and coordination with national and international agencies engaged in promotion and development of renewable energy. It is therefore, deemed the most suitable agency to take the lead role in the execution of the project, as the main objective of the first phase of the project is to devise policy, promote wind energy and creating an overall enabling environment to facilitate promotion of renewable energy resources in Pakistan. Within the project, AEDB would be the National Execution Agency, with the overall responsibility for the timely and successful implementation of the project, overall.

15. Private Power and Infrastructure Board (PPIB): PPIB operates under the Ministry of Water and Power, and was created in 1994 to provide a one-window facility to private sector investors in power generation. The organisation operates as a custodian of government policies related to private sector power generation and transmission, and is also responsible for handling all matters related to the implementation of these policies. The main activities of the PPIB include coordination with various federal and provincial agencies, the execution of Implementation Agreements (IA) with the independent power producers (IPPs) on behalf of the government, and the provision of necessary support to other organizations in the execution of associated agreements, such as Power Purchase Agreements (PPA) etc. PPIB would, therefore play a very important role while coming up with various policy packages, negotiation on financial mechanism etc. with the help of NEPRA and WAPDA with which it would coordinate under the auspices of the AEDB.

16. Pakistan Council for Renewable Energy Technologies (PCRET): PCRET was established under the Ministry of Science and Technology by merging the National Institute of Silicon Technology (NIST) and the Pakistan Council of Appropriate Technology (PCAT). The main role of PCRET is R&D on renewable technologies and setting up of small-scale projects at the local level. With regards Wind, PCRET is involved in the mapping exercise and is likely to have a key role in identifying new potential sites for the private sector investments under the Phase II of the project. PCRET's role in the continued wind mapping under the project is therefore foreseen.

17. WAPDA, the Pakistan Water and Power Development Authority, was created in 1958 as a Semi-Autonomous Body for the purpose of coordinating and giving a unified direction to the development of schemes in Water and Power Sectors, which were previously being dealt with, by the respective Electricity and Irrigation Department of the Provinces. Power generation, transmission and distribution is the main role of WAPDA and such the organization is a key player when it comes to on-grid energy production. The potential wind farm sites would be evaluated with WAPDA to assess the facilities required for on-grid connectivity, power purchase modalities and distribution.

18. Accordingly, the Government of Pakistan would execute the project, with overall responsibilities for execution vested with the Alternate Energy Development Board (AEDB). The Board will collaborate closely with the Ministry of Environment, playing a central role as the main government cooperating agency on MEAs, including the UNFCCC. AEDB would sign MOUs with potential implementing agencies, such as, Private Power and Infrastructure Board (PPIB), Pakistan Council of Renewable Energy Technologies (PCRET) and Water and Power Development Authority (WAPDA) for carrying out specific functions towards the achievement of outputs. In line with UNDP policies and procedures, the executing agency will be entrusted with co-ordination of the project, assuming the responsibility for the achievement of project objectives. The executing agency, in consultation with UNDP and MoE, would appoint a National Project Director as the focal point responsible for liaising with UNDP and MoE and being accountable in the utilization of project resources according to the project document and coordination with other line agencies and reporting

19. Project Steering Committee (PSC): Comprising of high-level government, private sector and NGO representatives, will oversee and guide project execution. It will ensure that important milestones are met and commitments from the concerned agencies made in a timely manner. The PSC will meet at least twice in a year to review progress, in line with indicators in the logical framework matrix. The key reporting instrument for the PSC to check project progress and delivery will be the yearly project implementation review (PIR) and the UNDP Tripartite Review (TPR) meeting will be expanded to coincide with one of yearly meetings of the PSC so that major challenges, suggested actions and solutions can be agreed on with the required political support and intra-institutional facilitation.(progress report on budget, workplans, updates)

20. The Secretary, MoE, will chair the PSC. Members will include the Resident Representative, UNDP, Secretary, EAD, GEF Operational Focal Point (GEF OFP), the National Project Director, the Project Manager, Chairman AEDB, Director PPIB,

Member Power WAPDA, Chairman NEPRA, Director General PCRET, Director General PMD, Managing Director ENERCON, Chiefs Energy Wings of Planning Division (GOP, GOSindh and GOBalochistan).

21. Further, the Chair of PSC may choose to co-opt members to the PSC to enhance the efficacy of the PSC. AEDB, through the NPD will serve as the Secretariat to the Committee and will take responsibility for organising meetings, recording minutes and ensuring that directions of PSC are implemented.

22. The PSC will be responsible for the following activities:

- project review, monitoring and co-ordination;
- co-ordination of government actions and provision of policy guidance;
- facilitating policy and legislative reform to support private investment for establishing wind farms in Pakistan;
- ensuring cooperation from different government agencies to facilitate smoother process of policy formulation, notification and adoption
- ensuring adherence to UNDP guidelines for the administration of project funds
- final selection of appropriate sites for the setting up of wind farms in the country

23. Executive Committee (EC): The EC working as the coordination panel would comprise the representation from the Economic Affairs Division (EAD), UNDP, AEDB, and the GEF OFP. The EC would be chaired by the National Project Director to be designated by the executing agency of the project. The EC will meet on a regular basis, not less than every quarter, to attend to all the different managerial and technical challenges faced by the project in its implementation and provide technical, managerial and political support so that Project Implementation Unit (PIU) and the executing agency, together with UNDP, can be enabled to effectively implement the project. The quarterly meetings will be facilitated by the preparation of progress reports and corresponding updates on the work plan and budget by the Project Manager/CTA, who will act as the secretary of the EC. The Project Manager/CTA would be responsible for providing the progress and decisions of EC to the higher level PSC.

24. Project Implementation Unit (PIU): Working as the nodal unit for the project, it would comprise three to four core staff, including a Project Manager/CTA, Deputy Project Manager, Administrative Assistant and M&E Officer. This will be supplemented by the hiring of national and international specialists, as needed, to match the ongoing cycles/progress of the project. The PIU will be under the direct supervision of the National Project Director. Project Manager/CTA will ensure the proper project follow up, liaison, approvals, and ensuring necessary inputs and support from relevant line agencies, in accordance with agreements under nationally executed UNDP projects. The PIU will be required to prepare annual project implementation reviews to the PSC meetings, technical reviews, quarterly progress reports and updated work plans to the EC meetings, and in addition will prepare financial and progress reports, as needed, to both the GoP Executing Agency and UNDP Pakistan.

25. The PIU would be responsible for:

- operational management of the project;
- accounting and funds management, according to the approved budget and annual work plan;
- micro-planning, scheduling and organisation of activities and tasks;
- preparing quarterly and annual operational work plans for submission to the Executing Agency and UNDP; managing equipment;
- monitoring and reporting to UNDP and the Government on the progress of implementation;
- Provide specialised knowledge on issues during consultations with GoP during policy formulation.

26. Sub-contracts: Under the authority of the Project Coordination Panel, the Project Manager would prepare sub-contracts for activities to be outsourced to technical agencies in line with the Project Cycle Operational Manual (PCOM -). Project Coordination Panel would decide to engage expertise from government agencies, private sector or non-governmental organizations based on the requirements of the project. The project contractors will be required to submit regular (monthly or quarterly) progress reports that will be disseminated to all the members of Project Steering Committee and Project Coordination Panel. An electronic mailing list of relevant staff from the GoP, GEF/UNDP, implementing agency, and key participants will be set up to ensure that they are routinely updated on day-to-day project activities. Important milestones and project outputs will be made available to the general public through the project's Web site, which will allow for feedback to be documents.

27. Financial Disbursements, Auditing and Procurements: PCOM procedures would be followed for financial disbursements to PIU and the sub-contractors. UNDP would conduct annual financial audits to ascertain the standard procedures are applied while making disbursements and required monitoring systems are in place for internal control and record keeping. All local and international procurements would be carried out according to the procedures detailed in the PCOM.

28. Inception Workshop: A project inception workshop would be held within three months of project inception. The participants of the workshop would include, the full project team, relevant government counterparts, GEF OFP and UNDP/GEF representative from the country office and the region. The inception workshop is envisioned to serve a two-pronged purpose i.e., establish ownership and understanding of the project goals and objectives as well as an understanding of the fundamental issues involved in achieving these targets. Based on such an understanding, finalization of the Annual Work Plan (AWP) for the first year of the project will be the important outcome of the workshop. Other significant objectives of the workshop can be broadly outlined as:

i) Orientation to PCOM rules and procedures.
ii) An understanding of the project's decision making structure e.g. reporting and communication lines and conflict resolution mechanism
iii) Overview of UNDP-GEF M&E requirements including the PIR, APR, TPR, MTE and the final evaluation.

iv) Details of roles, responsibilities and complementary coordination tasks of different partners including UNDP Country Office and the Regional Coordination Unit staff.

v) A review and, if required, revision of ToRs of staff and decision making structures.

29. The workshop, as such would then be the necessary first step to get all partners onboard and familiarised with different procedural and conceptual details of the project paving way for smooth implementation with all partners agreeing to a basic road map to be followed.

Part IV - Monitoring and Evaluation

30. The timely production of key results and overall impact of this project will depend upon an effective M&E strategy so as to utilize an adaptive management approach. The project intends to utilize different M&E instruments, described below, and different institutional arrangements to guarantee timely delivery within this project, both at the process and impact levels.

31. The project is designed with inbuilt flexibility to accommodate adaptive management. Therefore, a close scrutiny of day-to-day activities affecting the impact and outcomes of the project while remaining on course for the achievement of the objectives outlined in the original project design is a part of the project strategy. The emphasis is on being able to incorporate feedback and lessons learned from the M&E exercises into the project vision and project design.

32. The overall project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF

33. Whereas the LFA would be the leading M&E tool guiding the response to adaptive management on the design level, the following additional M&E tools would be used to feed into the log frame and tap the flexibility of the project design to adapt as and when necessary for more emphatic impact.

    1. Assessment of Development Results (ADR)

    Development Effectiveness Report

34. *Day to day monitoring:* This will be the responsibility of the CTA, supported by the National Project director. The monitoring of project implementation would be based on the project's Annual Work plan and its indicators. The fine-tuning of these performance and impact indicators would take place at the inception workshop with support from the RCU and the UNDPCO representatives.

35. Annual Monitoring: It will occur through the ***Tripartite Review (TPR).*** This is the highest policy-level meeting of the parties directly involved in the implementation of a project. The project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The project proponent will prepare an Annual Project Report (APR) and submit it to UNDP-CO and the UNDP-GEF regional office at least two weeks prior to the TPR for review and comments.

36. Additionally, UNDP Country Offices and UNDP-GEF RCUs as appropriate, will conduct yearly visits to projects that have field sites, or more often based on an agreed upon scheduled to be detailed in the project's Inception Report / Annual Work Plan to assess first hand project progress.

37. Annual Project Report (APR): The PIU would submit an annual self assessment report of the project through the NPD to the UNDP Country Office and GEF OFP, which would after review and rating forwarded to the RCU for further action, feedback and ratings. The APR will be used as one of the basic documents for discussions in the TPR meeting. The project proponent will present the APR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants.

38. The minimum requirement for what would comprise the APR is as follows:

- An analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome
- The constraints experienced in the progress towards results and the reasons for these
- The three (at most) major constraints to achieve ment of results
- AWP, CAE and other expenditure reports (ERP generated)
- Lessons learned
- Clear recommendations for future orientation in addressing key problems in lack of progress

39. Tripartite Review (TPR): TPR would follow the receipt of the APR and the PSC meeting scheduled at a time to review the APR and discuss other necessary details before the TPR. The TPR would be a forum where, if required, concrete redirections for introducing substantive changes within the project might be solicited from the government.

40. Mid-term Evaluation (MTE): The Mid term review would be, tentatively scheduled a year from the signing of the project, the dates firmed up during the first implementation workshop. This would an independent evaluation. The ToRs of the MTE would also be part of the agenda for the First Inception Workshop with the overall responsibility of firming the TORs lying with the PIU.

41. The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The ToRs for the MTE would be prepared by the UNDPCO.

42. Project Implementation Review (PIR): This report would be aimed at explicitly detailing information on implementation during the year. A copy each would be shared with the UNDP-GEF M&E unit. The PIR would also be directly feeding into the reporting to GEF M&E unit, thus keeping the council members abreast with the progress of the project.

43. Annual Audit: In addition to the continuous reporting described above, the project will also ensure annual external audits to ensure financial transparency and accountability while effecting proficiency of the financial management

44. Quarterly Progress: Additional reporting requirements would include Quarterly Progress reports submitted to the UNDPCO by the PIU, at the time of submitting request for quarterly advances. Also, a presentation of problems and way forward in the quarterly EC meetings are seen as a method further facilitating the ability to adapt managerially and operationally on a need basis.

45. Final Evaluation (FE): An independent evaluation undertaken within six months of the completion project. The findings of this evaluation would determine, among other things, the suitability of the project to embark on its second phase. The basic focus would be impact and sustainability that is provided to the establishment of a Wind Energy sector in Pakistan, by creating an enabling environment. It would also entail an assessment of the tools used to provide this enabling environment. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

46. Additional Reporting:

Inception Report (IR)

A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed First Year/ Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. This Work Plan would include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the project's decision making structures. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan included in the Project document. A timeframe for any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 months would also be included.

As recommended by the UNDP GEF M&E Toolkit, the Inception Report will provide an elaboration of the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners, building up on the discussion in the project document. In addition, a section outlining progress to date on project establishment and start-up activities and any changed external conditions that may effect project implementation.

The finalized report, reviewed by the UNDPCO and the RCU would circulated to project counterparts for feedback within one calendar month.

Technical Reports:

Since, the project is in an area which is unique and new for Pakistan, it seems necessary to provide technical reports in addition to those generated under PDF "B" to ensure

sustainability of establishment of the wind energy sector is Pakistan by provision of readily available resource material.

These projects would on the hand chart the contribution of the project in the particular area, while also disseminating valuable examples of best practices on the national and international level to be emulated by future ventures in Wind Energy sector and also allied sectors of other renewable energy sources. The specific areas for these technical reports would be decided at the inception workshop and elaborated upon in the inception report. These studies would be provided to the Information center established under the project for wider dissemination.

Project Publications:

These publications, in the form of pamphlets, handouts, posters etc. fed into, mainly, by the findings of the Technical Reports would be provided to the Information center for display and dissemination. Wind energy begin a whole new sector in the nascent renewable energy efforts in Pakistan, these publications would be extremely useful in information sharing while mapping the project's experience in different areas.

47. Learning and Knowledge sharing: The project strategy as outlined in the LFA emphasizes the knowledge sharing by establishing Information Center/Clearing House Mechanism and one-window facility for investors. In addition, the project would identify useful networks to participate in for learning and knowledge sharing.

48. Indicative Monitoring and Evaluation Work plan and Corresponding Budget:

This work plan and budget would be discussed and finalized at the inception workshop.

Type of M&E activity	Responsible Parties	Budget US$ *Excluding project team Staff time*	Time frame
Inception Workshop	▪ CTA ▪ UNDP CO ▪ UNDP GEF	1,000	Within first two months of project start up
Inception Report	▪ Project Team ▪ UNDP CO	1,000	Immediately following IW
Measurement of Means of Verification to assess Project Suitability of migrating into the next phase	▪ The CTA will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	To be finalized in Inception Phase and Workshop. Cost: 8,000	End of the project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	▪ Oversight by Project GEF Technical Advisor and CTA ▪ Measurements by regional field officers and local IAs	To be determined as part of the Annual Work Plan's preparation. Cost : 4,000	Annually prior to APR/PIR and to the definition of annual work plans
APR and PIR	▪ Project Team	None	Annually

	▪ UNDP-CO ▪ UNDP-GEF		
TPR and TPR report	▪ Government Counterparts ▪ UNDP CO ▪ Project team ▪ UNDP-GEF Regional Coordinating Unit	3,000	Every year, upon receipt of APR
Annual Audits	▪ UNDP CO	None	Every year to ensure and report on the efficacy of the project on financial and management procedures
Steering Committee Meetings	▪ Project Coordinator ▪ UNDP CO	5,000	Following Project IW and subsequently at least once a year
Periodic status reports	▪ Project team	5,000	Quarterly reports to be submitted to the UNDPCO by the PIU.
Technical reports	▪ Project team ▪ Hired consultants as needed	15,000	To be determined by Project Team, government agencies involved and UNDP-CO at the Inception workshop
Mid-term External Evaluation	▪ Project team ▪ UNDP- CO ▪ UNDP-GEF Regional Coordinating Unit ▪ External Consultants (i.e. evaluation team)	25,000	At the mid-point of project implementation.
Terminal Report	▪ Project Team ▪ UNDP-CO	3,000	Prior to external evaluation to report on the milestones and indicators
Final External Evaluation	▪ Project team, ▪ UNDP-CO ▪ UNDP-GEF Regional Coordinating Unit ▪ External Consultants (i.e. evaluation team)	30,000	At the end of project implementation

49. This rigorous system of regular monitoring and evaluation throughout the project will provide required information for key decision-making within the project and will provide the GoP, GEF and the UNDP with the necessary common understanding to agree on key decisions within the project.

50. Finally, an active exchange between this and other ongoing GEF and non-GEF funded commercial on grid wind projects, will be supported by the project. In particular very close cooperation will be established with other recently approved GEF wind projects

in Mexico, Tunisia, China, in addition to upcoming projects in South Africa and possibly Iran.

Part V - Legal Context

51. The legal context for UNDP-assisted programmes and projects in Pakistan is established by two major agreements: 1) the Convention on the Privileges and Immunities of the United Nations, given affect by Act XX of 1948 of the Pakistan Constituent Assembly (Legislative) and assented to on June 16, 1948; and 2) the agreement between the Government of the Islamic Republic of Pakistan and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme, signed by the parties on February 25, 1960.

52. This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article 1, Paragraph 2 of the agreement between the Government of the Islamic Republic of Pakistan and the United Nations Development Programme concerning assistance under the Special Fund Sector of the United Nations Development Programme.

53. UNDP-assisted programmes and projects for Pakistan are planned and executed in accordance with the global UNDP Financial Rules and Regulations and the Project Cycle Operations Manual for Pakistan.

54. The following types of revisions may be made to this project document with the signature of the UNDP resident representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes: a) Revisions in, or addition of, any of the annexes of the project document; b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation; and, c) Mandatory annual revisions which rephase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

55. The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

Section II—Project Work Plan and Budget

Award: tbd
Award Title: PIMS 624 [CC: Pakistan Wind Power]
Project Objective/Atlas Output = FSP: Pakistan Wind Power
Project ID: tbd

Project Outcome/Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET AND WORK PLAN				
			Budget Description	2004 US$	2005 US$	2006 US$	Total US$
Outcome 1: Wind power policy package	PIU and AEDB	GEF	72100 Contractual Services - Companies		110,000	120,000	230,000
	PIU	GEF	71600 Travel	10,000	60,000	30,000	100,000
	AEDB	GEF	74500 Miscellaneous		6,000	4,000	10,000
Outcome 2: Project facilitation for private sector investment in wind energy enhanced	PIU	GEF	72100 Contractual Services - Companies		40,000	30,000	70,000
	PIU	GEF	71600 Travel		40,000	40,000	80,000
	PIU	GEF	72400 Equipment		90,000	90,000	180,000
	PIU	GEF	74500 Miscellaneous		3,000	7,000	10,000
Outcome 3: Wind map of selected areas and detailed wind resource assessments for commercially promising microsites in the coastal region	PIU, AEDB and PCRET	GEF	72400 Equipment		300,000		300,000
	PIU, AEDB and PCRET	GEF	71600 Travel		20,000		20,000
	PIU, AEDB and PCRET	GEF	72100 Contractual Services – Companies		120,000	100,000	220,000
	PIU, AEDB and PCRET	GEF	74500 Miscellaneous		10,000	10,000	20,000
Outcome 4: Provincial	PIU and AEDB	GEF	72400 Equipment		125,000		125,000

and national capacity to manufacture (elements of), install and operate commercial grid connected wind energy facilities	PIU and AEDB	GEF	71600 Travel		150,000	75,000	225,000
	PIU and AEDB	GEF	74500 Miscellaneous		10,000	15,000	25,000
Outcome 5: Clearing house mechanism for awareness raising and dissemination of wind energy information to private developers, public sector, academic sector and civil society	PIU and AEDB	GEF	71600 Travel		15,000	15,000	30,000
	PIU and AEDB	GEF	72400 Equipment		150,000		150,000
	PIU and AEDB	GEF	74200 Audio visual/Print Production Costs		75,000	25,000	100,000
	PIU and AEDB	GEF	74500 Miscellaneous		7,000	8,000	15,000
Outcome 6: Financial instruments for sustainable grid connected wind energy development	PIU and PPIB	GEF	72100 Contractual Services - Companies		100,000	224,500	324,500
Outcome 7: Mainstreaming Renewable Energy	PIU, MOE and AEDB	GEF	72100 Contractual Services - Companies		120,000	120,000	240,000
Outcome 8: Project Management and Coordination	UNDP, EAD and AEDB	GEF	71200 International Consultants		120,000	102,350	222,350
	UNDP, EAD and AEDB	GEF	71300 Local Consultants	25,000	150,000	97,350	272,350
	UNDP, EAD and AEDB	GEF	72400 Equipment	20,000	40,000	20,800	80,800
	UNDP, EAD and AEDB	GEF	71600 Travel	5,000	30,000	15,000	50,000
			Grand Total GEF				**3,100,000**

Section III—other agreements

FROM : FAX NO. : Oct. 03 2001 04:22PM P1

Brig Dr. Nasim A. Khan
Ph.D(USA),M.S.M.E(USA),M.S.E.R(USA)
Secretary/Member Technical

AEDB

UNDP ISLAMABAD
17 JUN 2004

Ref No B/113/2003

Date 17/6/2004

Dear Dr. Onder Yucer,

This is in reference to the Sustainable Development of Utility Scale Wind Power Production Project formulated with financial of UNDP and Global Environment Facility (GEF).

AEDB understands that the first Phase of the project is designed to promote wind energy in Pakistan with focus on removing barriers and establishing the enabling environment for renewable energy, specifically, for wind energy, together with creating government, private sector and academia awareness and capabilities so as to facilitate its effective commercial deployment throughout the country. We are also aware that the completion of Phase I would lead to the actual setting up of the wind energy installation in Pakistan with additional support from UNDP/GEF.

The officials of the Alternative Energy Development Board(AEDB) were pleased to interact with the project formulation missions of UNDP/GEF in August 2003 and February 2004. In this regard, financial assistance (in grant) of US $ 3.1 million by GEF for the Phase I of the project will be a welcome step and AEDB would like to confirm matching in-kind contribution of US $ 0.72 million from the Government of Pakistan. please note that the in-kind contribution would cover the staff time and other facilities extended by the national institutions to the project.

AEDB looks forward to the final approval of the project by GEF and extend AEDB's full support for its successful implementation.

With best Regards,

(Brig Dr. Nasim A Khan)
Secretary/Member Technical

Mr. Onder Yucer
Resident Representative
United Nations Development Programme
Saudi Pak Tower
Islamabad

Section IV: Executive Summary and Annexes

GEF

PROJECT EXECUTIVE SUMMARY
GEF COUNCIL WORK PROGRAM SUBMISSION

AGENCY'S PROJECT ID: PIMS #624
COUNTRY: Pakistan
PROJECT TITLE: Sustainable Development of Utility-Scale Wind Power Production, Phase I
GEF AGENCY: United Nations Development Programme (UNDP)
OTHER EXECUTING AGENCY:
DURATION: 5 years (Phase 1: 2 years)
GEF FOCAL AREA: Climate Change
GEF OPERATIONAL PROGRAM: OP6—Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs
GEF STRATEGIC PRIORITY: CC2: Power Sector Policy Frameworks Supportive of Renewable Energy and Energy Efficiency
ESTIMATED STARTING DATE: July 2004
IA FEE (PHASE 1): 382,000

FINANCING PLAN (US$) GEF PROJECT/COMPONENT	
	Phase 1
Project	3,100,000
PDF A	24,931
PDF B	350,000
PDF C	
SUB-TOTAL GEF	**3,474,931**
CO-FINANCING	
GEF Agency	
Private equity	
Commercial debt	
Govt. of Pakistan	720,000
Sub-Total Co-financing:	**720,000**
Total Project Financing:	**4,194,931**
FINANCING FOR ASSOCIATED ACTIVITIES IF ANY:	
LEVERAGED RESOURCES IF ANY:	

CONTRIBUTION TO KEY INDICATORS OF THE BUSINESS PLAN:

- ✓ Avoided CO_2 emissions (indirect effects of phase 1): 1.77 million tons from project plant and 9.00 million tons from additional installations over 20 years
- ✓ National Policy Framework for Wind Energy in Pakistan, leading to the installation of an initial estimate of 60-80 MV of Commercial Wind Energy (following phase 1)

RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT:

Mr. Jawed Ali Khan, Director General, Date: *December 10, 2003*
Ministry of Environment, Government of Pakistan

Approved on behalf of the *United Nations Development Programme (UNDP).* This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the GEF Project Review Criteria for work program inclusion

Yannick Glemarec
Deputy Executive Coordinator
Date: 18 February 2004

Project Contact Person:
Olav Lundstol
UNDP GEF Portfolio Manager (Climate Change)
Asia and the Pacific
Tel: +603 2091 5171, E-mail: olav.lundstol@undp.org

Project Summary

Project Rationale, Objectives, Outputs, and Activities

1. The project derives from a detailed set of background and site-specific studies conducted during the PDF 'B' phase.[5] These studies included both general background studies such the overall policy environment for renewable energy IPPs, in addition to regional and site specific studies (after the initial choice of a promising possible pilot site had been done during the PDFA). The detailed studies included an assessment of the regional power supply and demand situation detailed wind measurements and analysis at the initially proposed wind farm site near Pasni, complete environmental impact assessment of the proposed plant site, technical specification of plant equipment, as well as detailed financial and economic analysis, including calculation of costs of wind power generation, avoided diesel generation, and incremental project activities. The design of phase 2 of this project will now only be decided in detail during phase 1 and the idea will be to open phase 2 to a competitive choice between different sites to implement commercial on-grid wind energy in a sustained manner. Thus, details on actual engineering and financial requirements will be developed during the first part of the proposed project. Finally it is important to emphasize that both regional and national grid connected site alternatives will be analyzed and assessed, in order to provide a robust commercial approach to wind energy development in Pakistan.

2. This project aims to reduce GHG emissions[6] through the facilitation of commercial-scale exploitation of renewable wind energy for power production in Pakistan. It focuses on establishing a wind power industry in the country based on internationally proven technology as an economically viable and sustainable option by removing policy, institutional, regulatory, fiscal and technical barriers to private investments in wind farms and their integration into the power grid, especially in remote areas where alternative generation options are limited and/or costly.

3. The project will be implemented using a phased approach where phase 1 (2 years) will focus on removing barriers linked to a currently weak or non existent enabling environment for on grid renewable energy and specifically for wind energy, together with creating government, private sector and academic awareness and capabilities so as to facilitate its effective commercial deployment throughout the country. Towards the end of phase 1 the project will also start the required steps of a procurement process (expression of interest) related to piloting the first commercial on grid wind energy installation/s[7] in Pakistan. This barrier removing

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[5] Appended as Annexure D.

[6] It is estimated that the demonstration plant alone will displace about 1.77 million tons of carbon dioxide-equivalent emissions in the baseline diesel generation scenario over a 20-year lifetime, and that replication of such farms along the coastal belt of Makran could increase this mitigation potential to 9 million tons over a similar period.

[7] Initially the PDFB background studies and the design was based upon one specific project site, Pasni in Balochistan and the estimated costs figures for phase 2 mentioned in this document still correspond to this assumption. However after review by the external STAP expert and the GEF secretariat, it was agreed to leave phase 2 open to different sites and let the details of the procurement process be decided towards the end

exercise will then create the necessary conditions for phase 2 (3 years) to be presented to the GEF for final approval with adjusted and confirmed estimates of funding from different sources and the conditions attached. Phase 2 will then consist of the initial implementation of the specific enabling environment including contractual and financial conditions to sustain the first commercial on grid wind energy operations on a continued basis (currently the assumption and the costing for this phase was based upon the PDFB defined 15 MV, however this will change as a result of the implementation of phase 1 of this project and it will be resubmitted for GEF approval).

4. Some of the main outputs of the first project phase will include effective policy and incentives, including the piloting of an appropriate tariff level and structure, applicable to wind power IPPs; institutional capacity within the relevant Government of Pakistan (GoP) agencies to plan, appraise, implement, and facilitate the operation of grid-connected wind farms; transfer of relevant wind analysis and power project design, development, and operational expertise and technology to the country, including the local manufacture of selected plant components, together with future plans and mechanisms for expanded local manufacturing capability; the assessment of wind power potential, wind speeds, and sites for future wind farms; and assistance to the construction and operation of a business demonstration wind power IPP to evaluate practical feasibility and improve investor confidence in this relatively new technology.
5. Through these activities and objectives, it is envisaged that the project will greatly help in identifying and removing existing barriers to wind power development in Pakistan, and in preparing the groundwork for the establishment and future growth of this industry in the country as a viable and clean power generation option (detailed Log Frame can be found in Annex B of this document).

Key Indicators, Assumptions, and Risks (from Log Frame)

6. This project and its success will rely critically upon several key institutional actors together with the private sector. The Government of Pakistan (GoP), both at the provincial and at the federal level, will be responsible for providing conditions tailored for grid-connected wind energy and for its commercial operation, in all instances at a minimum level commensurate with the alternative costs of generation, as indicated in some of the background studies of this project conducted under the PDF 'B' phase.
7. In addition, for phase 2 it is anticipated that the GoP will provide facilities, such as import duty exemption on necessary hardware and software, land donation, and specific recognition in the relevant legal and contractual instruments[8] required in a

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of phase 1 when we will have the information on what will constitute the package of incentives, tariffs, contracts e.g. that the GOP with targeted GEF support can offer to these first commercial on-grid projects.

[8] Such as the Implementation Agreement (IA), Letter of Support (LOS), and possibly adjustments in the payment method under the Power Purchase Agreement (PPA) to account for the fact that wind is an intermittent source of energy.

policy package to remove barriers and biases against wind IPPs, as well as recognize their economic and environmental benefits explicitly, thereby rendering them more feasible in competition with conventional fossil fuel-based power generation as a sustainable means of meeting local energy needs.

8. This overall policy package will be designed and negotiated in detail during the first phase of this project (2 years), and specific benchmarks will be agreed as prerequisites for embarking on phase 2 of this project (3 years) where a competitive enabling framework and corresponding contracts and incentives tailored for on grid wind energy, will be implemented on a selective basis (>15 MV) depending on agreed commitments from the key institutional stakeholders and interested investors. The project duration may be shortened if critical milestones, agreements and enabling framework for plant construction can be expedited by the relevant stakeholders concerned. GEF will facilitate with technical assistance, capacity building, support towards major barrier removal activities, and the design and initial implementation of the most cost-efficient financial mechanisms so as to successfully implement commercial grid-connected wind IPP and, thus, its further replication in the country.

9. It is expected that the project (as indirect effects of phase 1) will contribute to a reduction in the growth rate of GHG emissions from the energy sector in Pakistan and trigger at least a total of 60 to 80 MW of commercial wind energy installations, thus resulting in a total of 9 million tons of CO_2 reductions over a 20-year time horizon. Furthermore it is expected that the project will contribute to the establishment of a fully adapted enabling framework for grid-connected wind energy (and other grid-connected renewable technologies) in the country, so as to open the opportunity for more massive replication in different promising regions of Pakistan.

10. Potential project risks can be classified in different categories, such as technical, commercial, financial and managerial. As mentioned above, the success of this intervention will depend critically upon the interest of the private sector to bid for the installation and operation of the grid-connected wind plant. To achieve this, all the risks and uncertainties need to be addressed to a satisfactory level for phase 2 to take place in continuation of this phase 1 within the project, progress needs to be made in negotiating issues such as duration of PPA, tariff structure for power sales to the utility (both level and structure, considering the split between capacity payment and output payment), and guarantee and risk mechanisms (to address risk areas, such as construction, technology, resource, operation and power sales). Specific risk mitigation strategies are built into the project design and a strict M&E approach will be applied so as to ensure project progress. Key government representatives from various ministries and institutions will oversee the overall strategic direction of the project (a steering committee that will meet on an annual or bi-annual basis), in addition to a more operational level executive committee that will meet every month or bi-monthly (see the Log Frame in Annex B for more details on indicators, assumptions and verifiers). Designation of a high-level government 'champion', such as the Alternative Energy Development Board

(AEDB),[9] will be imperative to coordinate and ensure that such vital institutional and policy support is provided, as required, throughout the project cycle.

11. The overall policy environment for IPPs in Pakistan is now well established, after initial teething problems that led to temporary generation overcapacity and high consumer tariffs. Since the first batch of 16 IPPs became operational subsequent to the 1994 policy, individual bulk power sales agreements have been individually renegotiated to bring them in line with current production and financing costs and reduce windfall profits resulting from decreased technology costs. As a result, the unsustainably high financial burden on the national utility of guaranteed capacity payments has been brought down, and consumer tariffs are moving past the front-loaded high tariff rates to lower long-term levels. Several subsequent power policies, building on this rich experience, have since been formulated, the current one having been announced in 2002. These policies heavily favor indigenous fuel-based generation, including renewable resources. Institutional arrangements for project facilitation, regulation, and utility operations are also much further along than in the 1990s, providing a more stable supporting base to private power producers, even as important power sector reforms, including major privatization initiatives, continue. Thus, the developments of the proposed commercial wind power plant/s in phase 2 of the project will benefit from the increasingly mature IPP industry in Pakistan, although specific issues concerning wind power projects would require the technical assistance and capacity building planned to be provided in phase 1.

Country Ownership

Country Eligibility

12. Pakistan ratified the UNFCCC on June 1, 1994.

Country Driven ness

13. The project is designed to work in tandem with the government's overall long-term development plans, sector plans and national environment and energy strategies. Central national level policy instruments such as the National Conservation Strategy (1992), National Environment Action Plan, 2002 Policy for Power Generation Projects, Vision 2025 of WAPDA (the state-owned national power utility), together with regional development strategies and projects, all emphasize the importance of renewable energy towards achieving economic growth, improved environmental indicators and diversified sources of energy within the national mix. The recently established Alternative Energy Development Board (AEDB) underlines the GoP's commitment to facilitating the promotion of renewables at the national level in a more concerted and focused manner.

[9] Under current GoP institutional arrangements, the AEDB has been appointed at the Prime Minister's Secretariat to directly oversee and promote the development of renewable energy capacity in the country, including processing approvals for all such generation projects up to a capacity of 50 MW.

14. The coastal regions of Pakistan have been identified by the Government of Pakistan as promising for initial implementation of grid-connected wind energy, and apart from an apparent growth potential along the coast there are also simultaneous plans and associated infrastructure investments being made for example in the provincial state of Balochistan, such as the Gwadar Deepwater Port, Special Economic Zone and the Coastal Highway. All of these projects are progressing on schedule and the priority placed on the development of the province of Balochistan has been strongly confirmed.

Program and Policy Conformity

Fit to GEF Operational Program and Strategic Priority

15. The project is consistent with the GEF Operational Program 6: 'Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs', as well as the GEF Strategic Priority 3 within the climate change focal area that promotes: "power sector policy frameworks supportive of renewable energy and energy efficiency." It is expected that the project intervention will significantly contribute towards the expanded commercial use of renewable energy through the lowering or elimination of major barriers within the relevant investment framework and through the building of business experience with grid-connected wind energy in Pakistan. Related to this, the estimated average implementation costs are expected to fall as additional private wind ventures get off the ground. The proposed project is also consistent with the national programs, policies and priorities of the Government of Pakistan that are specifically addressing expanded participation of renewable energy sources within the overall energy mix that feeds regional and central grids.

Sustainability (Including Financial Sustainability)

16. The project has from the outset targeted long-term sustainability as a key objective, by focusing on the commercial feasibility of wind power-based IPPs in Pakistan. This submission is only to get approval for the needed barrier removal exercise linked to phase 1 of the project. As such the sustainability discussion cannot be complete since the underlying justification for the sustainability of the project critically depends on the expected implementation of commercial wind energy in phase 2 of the project that will be presented after phase 1 is over and the critical benchmarks have been reached.

17. Thus for project phase 1 the critical elements of sustainability will be that the project manages successfully to establish the appropriate on grid wind energy enabling framework (contracts, conditions-levels and structure of model contracts, financing-incentive mechanisms e.g.) together with the needed individual, organizational and institutional capacities to support commercial planning, negotiation, construction (possibly with elements being locally produced/assembled e.g.) and operation of on grid wind energy.

18. For the expected phase 2 of the project, the overall sustainability and specifically the economic and financial sustainability will be put to the test specifically through the initial implementation of the tailored conditions for on grid wind energy. Within this the GEF is expected to contribute to the demonstration of a viable enabling framework with associated financial opportunities and incentive structures built into it, such that installed and planned on grid wind energy can be proven on a commercial basis.

19. To substantiate this overall goal of the project expected to be proven most directly only during phase 2 of the project, the PDF 'B' phase did a series of calculations to compare the costs in the case of a 15 MW Pasni wind plant with the real alternative costs of a baseline diesel installation (with the same GWh output per year) for the same region. It is this comparison, and the fact that the highest wind potential in Pakistan more often than not is found in the remotest regions (where regional/local grids often cannot be connected at a competitive cost to the central grid), that makes the business demonstration within the regional grid in Balochistan an interesting case study.

20. Note however that these calculations and the data presented below are now only indications of what could be one commercial project to be supported under phase 2 of this project. However we have chosen to keep the information in to serve the purpose of illustration. As mentioned above the exact design of phase 2 is still to be revised and the anticipated GEF support would target a generalized sustainable incentive approach where developers compete possibly with different sites proposed. A general principle of progressive decrease of specific initial incentives to boost wind energy projects will be analyzed and implemented in an optimal manner such as to promote competition and market development most effectively.

21. The calculated levelized production costs for a Pasni wind plant range from 14.0 US cent/kWh to 8.8 US cent/kWh (at constant prices) with an assured 16% return on equity (in real terms) under the various assumptions and scenarios considered, such as level of interconnection support, concessional financing, and fiscal incentives provided as well as cost and capacity utilization variations. Since such assumptions will only gradually be verified (as part of the objectives of Phase 1), this production cost range can be taken as indicative of a suitable range for the final tariff rate. By comparison, the present diesel generation on the Makran grid ranges from 19 to 52 US cent/kWh, while the calculated cost of equivalent new diesel capacity would be about 12 US cent/kWh. However, based on current experience, such a new installation could not be expected to operate at its optimum operational efficiency in a remote location, and therefore the avoided cost of the diesel generation alternative to the wind power project can be assumed to actually lie somewhere in the range of 12 to 50 US cent/kWh, which would constitute the benchmark against which the wind power production costs in the Makran region should be assessed. Thus, the project would seem to be potentially financially viable given present and alternative generation options in the region.

Replicability

22. During the PDF background studies the issue of replicability was much focused on the Makran coastal region in Pakistan and in that region it was estimated that a potential for 4-6 commercial wind farms existed with a corresponding capacity of 60-80 MW. However in light of review comments and recent developments within Pakistan we now aim to estimate the replication potential closer during phase 1 of this project and we expect other promising regions to be included also possibly in phase 2 and at least specifically in terms of replication potential for commercial on grid wind developments in the future. The potential of all relevant sites for commercial wind developments in Pakistan will be considered during Phase 1 of this project, and the bidding process and details on what potential regions will be opened up for wind energy developments will be based upon such assessments.

23. Other potential wind IPPs in the rest of Pakistan are also planned to be developed in parallel, and the overall replication potential in the country could be much higher, even if some immediate constraints may exist in the Makran region. The overall national potential for grid-connected wind farms has so far not been properly assessed, although efforts are underway in this direction (including the PMD wind mapping exercise). Phase 1 of the full-scale project will help define this more clearly by gathering and assessing additional wind speed data for different locations in the country. Thus, on a countrywide basis, ~100 MW can safely be assumed as an achievable immediate (5-year) countrywide target independent of possible geographical grid integration or demand limitations specific to the Makran region. For example, the Alternative Energy Development Board has defined a target of 1,700 MW of commercial RE in the country by 2015, and is in advanced planning for the possibility of a 100 MW wind farm at Gharo in the adjoining Sindh province.

24. The current project has already generated significant interest from the private sector and the media in Pakistan, including unsolicited proposals for investments in wind farms at different locations. This interest, combined with the present national government trend favoring renewable energy, could be cashed in on with activities aimed at easy accessibility to and dissemination of information and lessons learned through a stable institutional arrangement as well as suitable policy measures.

Stakeholder Involvement

25. The project was designed following an intensive process of conducting eight background studies during the PDF 'B' phase, completed during the period from May 2001 up to July 2003, that were fundamentally guided by onsite investigations, data collection and analysis, interviews, documentary research, and a string of consultations and workshops conducted at local, provincial and national levels with all stakeholders from government institutions, private sector, academia and civil society involved. A recent exercise to confirm the Log Frame that is being proposed was also conducted in Islamabad in August 2003 with broad stakeholder representation, including the provincial government of Balochistan.

26. During the PDF 'B' phase, stakeholder participation was ensured through direct contacts, interviews, field missions, workshops and Project Steering Committee discussions with key government agencies, provincial officials, and potential private sector partners. The main partners included, besides the Ministry of Environment, the Ministry of Science and Technology, Ministry of Water and Power, WAPDA, PPIB, NEPRA, PCRET, PMD, ENERCON, federal and provincial P&D departments, NGOs, communities in the vicinity of the project area, and the office of GEF Operational Focal Point. More recently, in August 2003, the newly created Alternative Energy Development Board (AEDB), mandated to oversee all renewable energy projects of up to 50 MW capacity, has also been fully briefed on the project design.

27. Individual and organizational-level consultations culminated in a two-day national workshop held in July 2002 to identify and obtain feedback on baseline conditions and barriers to wind energy development. This event also addressed policy framework requirements and identification of potential donors at the national and international levels.

Monitoring and Evaluation

28. The timely production of key results and overall impact of this project will depend critically upon an effective M&E strategy so as to utilize an adaptive management approach. Below we will briefly highlight how this project intends to utilize different M&E instruments and different institutional arrangements to guarantee timely delivery within this project, both at the process and impact levels. First we outline the three main project levels of M&E and corresponding responsibilities:

1. Project Steering Committee (PSC), comprising of high-level government, private sector and NGO representatives, will oversee and guide project execution. It will ensure that important milestones are met and commitments from the concerned agencies made in a timely manner. The PSC will meet at least twice in a year to review progress, in line with indicators in the logical framework matrix. The key reporting instrument for the PSC to check project progress and delivery will be the yearly project implementation review (PIR) and the UNDP Tripartite Review (TPR) meeting will be expanded to coincide with one of yearly meetings of the PSC so that major challenges, suggested actions and solutions can be agreed on with the required political support and intra-institutional facilitation.

2. Executive Committee (EC), comprising of the GoP's Economic Affairs Division (EAD), GEF/UNDP, and the Ministry of Environment, in addition to a maximum of two to three selected representatives from other relevant line agencies, such as AEDB, WAPDA, PPIB, and GoB. The EC will meet on a regular basis, not less than every quarter, to attend to all the different managerial and technical challenges faced by the project in its implementation and provide technical, managerial and political support so as the PIU (see below) and the executing agency, together with UNDP, can be enabled to effectively implement the project. The quarterly meetings will be facilitated by the preparation of progress reports and

corresponding updates on the work plan and budget by the Project Manager/CTA, who will act as the secretary of the EC.

3. Project Implementation Unit (PIU), comprising of three to four core staff, including a Project Manager/CTA, Deputy Project Manager, Administrative Assistant and M&E Officer. This will be supplemented by the hiring of national and international specialists, as needed, to match the ongoing cycles/progress of the project. The PIU will have an assigned GoP official as the National Project Director that will ensure the proper project follow up on behalf of the GoP, including provision of liaison, approvals, and ensuring necessary inputs and support from relevant line agencies, in accordance with agreements under nationally executed UNDP projects and in close coordination with the assigned UNDP representative for this project. The PIU will be required to prepare annual project implementation reviews to the PSC meetings, technical reviews, quarterly progress reports and updated work plans to the EC meetings, and in addition will prepare financial and progress reports, as needed, to both the GoP Executing Agency and UNDP Pakistan.

29. In addition to the continuous reporting described above, the project will also ensure annual external audits and an external independent evaluation at the end of phase 1. These will provide required information for key decision-making within the project and will provide the GoP, GEF and the UNDP with the necessary common understanding to agree on key decisions within the project.

30. It is important to note that the project will be resubmitted to the GEF for the approval of phase 2 and the associated funding request from GEF. Fundamental milestones will be drafted and agreed with all relevant stakeholders and success in reaching these as required before approval of phase 2 will be clarified, monitored and verified through the above mentioned independent evaluation that has been budgeted for within the M&E budget of the project. Fundamentals to be considered include, tariff (structure and level), model contract, and financing mechanisms[10].

Financial Modality and Cost Effectiveness

31. The total cost of the project phase currently being presented is US$ 3.82 million, divided between US$3.1 million from the GEF and US$ 0.72 million[11] from the GOP. This initial part of an overall expected project of 5 years (including a separate phase 2, of 3 years, that will be presented to the GEF once phase 1 has successfully been concluded). Phase 1 will aim to successfully remove the major barriers linked to establishing an effective enabling framework for commercial wind energy in Pakistan and building appropriate individual, organizational and institutional capacities to promote wind energy development with private sector involvement.

[10] A refinement of the exact meaning of this statement, with indicated reference benchmarks and possible agreed levels and verifiers, will be included as part of the work in phase 1 of the project.

[11] GoP's main co-financing will come in the form of equity contributions for project land, access and interconnection facilities in Part B, which would be substantial. The cofinancing amount mentioned in the ProDoc relate mostly to contribution in kind to Part A activities.

32. Because phase 1 of this project has been estimated with a zero baseline and the nature of the activities are fully incremental in nature, the expected funding from GEF is considerable. This is expected to be balanced once the project enters into phase 2 (to be presented and approved separately) where the co-financing ratios and resources mobilized especially from the private sector but also from the GOP are expected to be considerable (above 1:10 when compared to expected GEF funding for phase 2). The total funding for this project phase 1, is US$ 3.82 million, where the GEF will cover US$ 3.1 million and the GoP will provide the remainder of US$ 0.72 million, divided between different activities.

33. Indirect effects of phase 1 (to be achieved within phase 2 and as a result of replication effects) are the estimated GHG emission reduction through the project will be 1.77 million tons of CO_2 (over a 20-year lifetime) and including replication effects in the region, the overall figure is 9 million tons of CO_2 over the same period. The GHG emission reduction can be significantly enhanced if this project also spurs the development of larger scale wind energy plants elsewhere in the country, as expected.

Co-financing Sources				
Name of Co-financier (Source)	**CLASSIFICATION**	**TYPE**	**Amount (US$)**	**STATUS***
Government[12]	Tax exemptions and in-kind		Phase 1: 720,000 Total: 720,000	Agreed and expected written confirmation of phase 1 co-financing by February 2004
Unidentified private IPP[13]	Cash			Letters of interest from selected private IPP companies by February 2004
Subtotal Co-financing			**Phase 1: 720,000** **Total: 720,000**	

[12] GOP confirmation of co-financing and other related funding for the expected phase 2 of this project, will be submitted together with the required documentation as agreed to the GEF to get separate approval of the viability and eligibility of that project phase.

[13] Some private companies have already showed considerable interest in participating in commercial wind energy development in Pakistan and these will be further confirmed

Institutional Coordination and Support

Core Commitments and Linkages

34. UNDP is actively involved in environmental capacity building and climate change programs in Pakistan through funding from its own resources and GEF, as well as coordinating other donor support. The proposed GEF project is also in line with UNDP's Support Programme to the National Environment Action Plan (NEAP-SP) in the area of renewable energy development. Other institutional support from the GoP and its relevant agencies has also been ascertained through project consultations and the logical framework dialog, as well as stated national policy directives and objectives. Provincial and local government endorsement has been indicated through direct consultations during the PDF 'B' formulation. The Alternative Energy Development Board (AEDB) has indicated strong support at the highest levels in GoP towards facilitating the implementation of this project.

35. Additionally, the current project also fits well within UNDP CO commitments under its Strategic Results Framework (SRF). The framework emphasizes sustainability in development and in the livelihoods of the poor, both at the policy level (including fulfillment of country commitment under multilateral agreements pertaining to the environment) and at the wider implementation level under the thematic area of Energy and Environment. The present project links up with the SRF by providing a mitigation mechanism for GHG emissions at the national level, paving the way for Pakistan to execute its global commitments under the UNFCCC in line with the second sub-goal (Regional and Global Instruments for Environmentally Sustainable Development that Benefits the Poor). At the national level, the formulation of a comprehensive policy package as part of the barrier removal activities would enhance the ability of the government to promote its renewable energy development objectives. The proposed wind farm site at Pasni is located in a relatively underdeveloped area of Pakistan, comprising mainly of low-income fishing communities. The setting up of such a power plant would bring much needed development to the area, enhancing local economic opportunities and provision of basic social services. By using a renewable source such as wind, this project ensures that such development is environmentally sustainable.

Consultation, Coordination and Collaboration Between IAs, and IAs and ExAs, If Appropriate

36. Of the other GEF agencies, the PDF 'B' phase initiated the consultative process with the Asian Development Bank (ADB) and the World Bank (WB). The consultation consisted of a combination of individual meetings as well as use of the platform of the Donors Coordination Group where the final PDF 'B' findings and full-scale project design was presented in July 2003. On the recent mission to Islamabad in early August 2003 by the UNDP GEF Regional Coordination Unit, individual meetings were held with both the WB and ADB to identify possible areas of overlap and/or areas of cooperation.

37. With the WB, it was agreed to continue the dialogue and target studies and technical assistance related to overall energy framework reform and some upcoming studies that the WB will be promoting in that area. With the ADB, a potential for replication was identified related to their upcoming PPTA on renewable energy development in Pakistan. At the moment this is still at the level of a pre-feasibility study and focused on the micro-hydel sector, but there was interest to include wind energy if the first stage of the proposed UNDP GEF wind project would produce sustainable conditions for wind investment. Thus, this project constitutes an important mechanism for replication and inter-GEF agency cooperation and synergies.

Project Implementation Arrangements

38. For information on this, please see Section 3.e above on Monitoring and Evaluation. For information on project implementation arrangements, see the Project Document under Section 3 on Management Arrangements and Exhibit 2 below.

39. An important element of the project is the two-phase approach, whereby Phase 1 would prepare the broader national context for evolving a wind-friendly investment climate in the country as well as undertaking the preparatory arrangements required for initiating commercial support scheme anticipated in Phase 2. While the specific requirements for the first task have been spelled out under Outputs 1 to 7 of the IC analysis in the following section, the key benchmarks for determining a successful transition from Phase 1 to Phase 2 would probably include the following:

Milestone and Triggers for Phase 2

40. The purpose of this section is to clarify what will be the key milestones and triggers that will have to be present at the end of phase 1 of this project, in order for the project to be submitted for phase 2 funding and follow up. First it is important to clarify that the present project document only covers phase 1 of this project and a GEF funding request for this phase.

41. Phase 2 of this project will be resubmitted as a separate document through the UNDP and GEF approval channels, following an independent external evaluation at the end of phase 1 to establish whether the key milestones and triggers agreed with the GEF have in fact been accomplished and therefore the required conditions for phase 2 are present. If the milestones and triggers are accomplished, the required full size project documentation (ex summary and project document) will be prepared and submitted for work program inclusion and approval by the GEF council. Currently it is expected that such a submission could take place in 2007.

42. Below we describe t a general milestone that will have to be reached, in order for the project to move towards a second phase, together with 3 specific triggers that will be utilized as conditions for preparing the follow up project submission (phase

2). As such they all represent key achievements/impacts expected at the end of phase 1:

Phase 1 Milestone:

i. **Incremental Value of a Wind Business Demonstration**

The value of a business demonstrator wind farm (from 10-100 MV, identified through an official GOP bid solicitation process managed by the AEDB and PPIB and based upon the identified results from the planned wind resource assessments and policy and tariff reforms) created with GEF support would be realized only if it directly helps expedite additional commercial WE investments in the country in the immediate term (i.e., within a year or two of its successful operation). Therefore, the need for such a project would arise if, towards the end of Phase 1 activities, a) the status of ongoing and firmly committed wind power projects in Pakistan remains below planned annual national RE targets[14], and b) it is determined that the demonstration plant could operate on a self-sustaining and financially profitable basis over its lifetime under the existing power generation and pricing regime without additional 'one-off' concessions (that would not necessarily be available to other commercial WE developers).

Phase 2 Triggers:

ii. **National Wind Resource Map and Assessments,** this would build upon the already ongoing wind mapping effort (by the Meteorological Department). The macro level mapping exercise will be complemented by selected micro sites measurements in different promising regions, covering up to a minimum of 5 distinct regions in Pakistan. The trigger is the availability to investors and interested parties of such a wind map and of the indicative wind measurements that will guide the interest and expected government tender processes to develop commercial wind farms in Pakistan.

iii. **New Wind Energy Policy and Fiscal Regime,**

The formulation of a detailed wind power IPP policy package, including fiscal and financial regimes needed to make it operational, duly endorsed by the federal cabinet and issued by the GOP through the AEDB, represents an essential prerequisite for defining the key investment parameters of a commercial wind IPP. The project in Phase 1 will identify which measures and policies are at least necessary ("sufficient") to guarantee a sustainable expansion of wind power in Pakistan, but will also give additional recommendations. The successful completion of this milestone will be determined not only by:

1. The adoption of the new policy package by the GOP, but also by

[14] For example, the stated GOP target of obtaining 10% of total power produced in the country through renewable energy resources by 2015.

2. The fact that a sufficient number of Phase 1 policy recommendations, measures, and incentives are included in the final package offered to commercial investors in wind energy, upon which the policy efficacy will ultimately hinge.

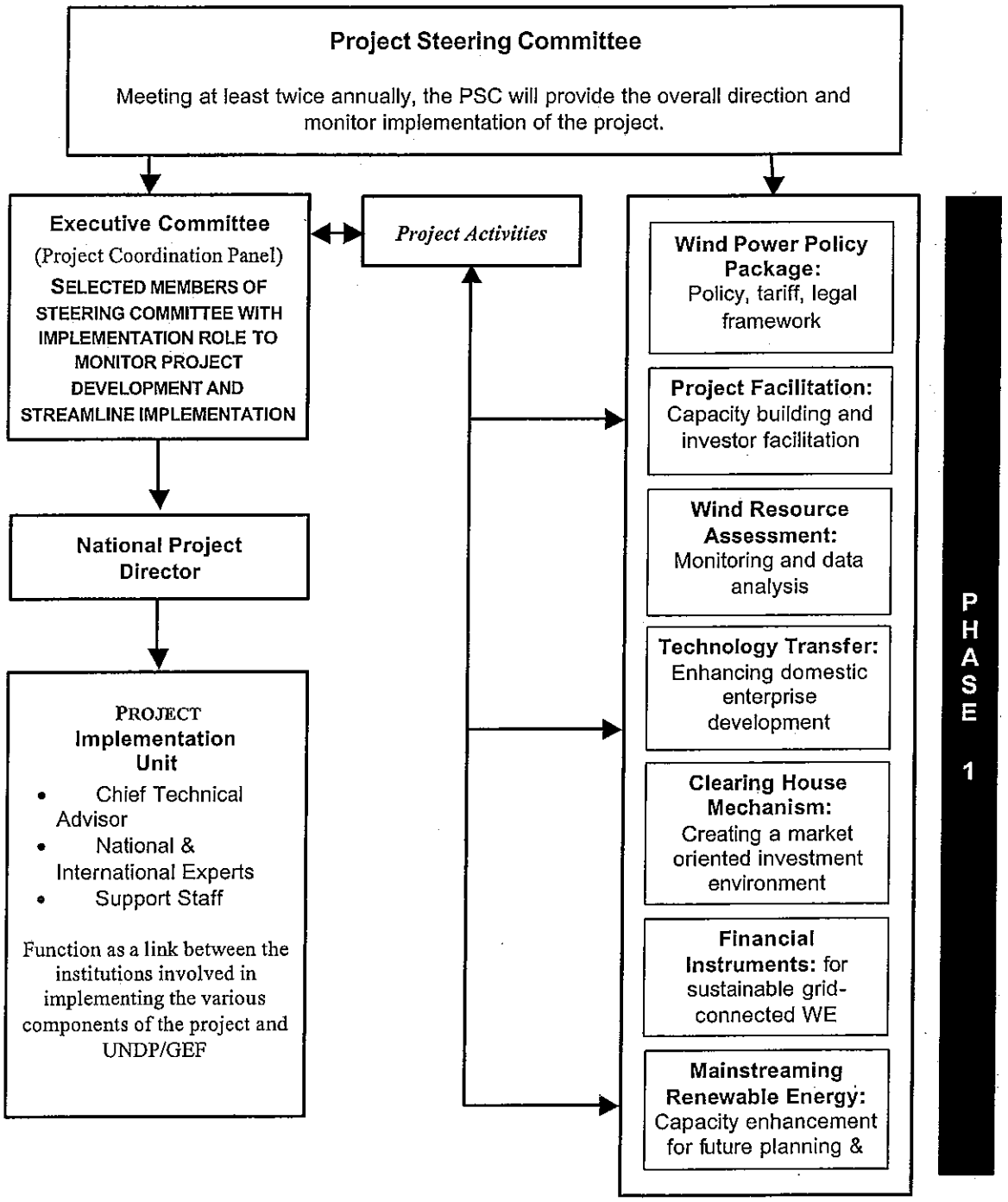
The latter represents the trigger for this milestone, and interacts intimately with the above milestone and triggers.

iv. Competitive Wind Power Tariff and Purchase

1. Definition of the bulk power purchase tariff formula and structure by the regulatory agency (NEPRA), keeping in mind the variability, relative costs and dispatch priority of WE, as well as regional power T&D requirements, is required to enable potential investors to evaluate the financial feasibility of wind power IPP projects and to conclude sustainable power purchase agreements (PPAs) with the utility.
2. Official notification will be given by the Ministry of Water and Power in the Gazette of Pakistan of such a tariff regime to be determined by NEPRA.
3. In addition a necessary supporting financial instruments, possibly involving a dedicated support mechanism for a green tariff fund and its funding sources identified and pledged, will all be developed under IC Outputs 1 and 7, under the responsibility of AEDB within the Government of Pakistan.

The above represent a necessary composite trigger that will need to precede commercial bid solicitations from wind developers.

Exhibit 2: Structure for Project Implementation



ANNEXES

Annex A: Incremental Cost Matrix (phase 1, with some estimates for the expected phase 2 of this project)

Output	Baseline	Alternative	Increment
Output 1. Wind Power Policy Package: Evolve an appropriate tariff regime, policy and incentives package, and legal framework applicable to generators of wind power.	No standard evaluation method for calculating wind power tariffs exists. Lack of experience of building and operating wind farms in Pakistan means that perceived costs are relatively high. This together with the absence of proper cost accounting for alternative forms of power generation and a tariff structure that ignores the peculiarities of wind power generation, makes wind power appear uncompetitive relative to fossil fuel alternatives. Unlike the thermal and hydel power sectors, no specific framework in place at any level for would-be investors in wind power projects in Pakistan. Therefore, the legal, regulatory and financial hurdles that have to be overcome in order to operate in the sector continue to be a major disincentive. No new financial mechanisms introduced. No attempt is made to create and win GoP endorsement of a package of incentives and policy measures for potential investors in wind power generation. This means that financing for a wind project is hard to obtain, the perceived risks high, and the terms offered relatively unattractive. Government taxes and duties increase the costs for wind power generation and do nothing to help its competitiveness compared to conventional alternatives.	Tariff regime evolved that takes into account the particular characteristics of wind power generation (principally it's relatively low capacity utilization figures and the intermittent nature of the power generated). The proposed tariffs incorporate a return sufficiently attractive to entice potential investors into wind power generation, but also fit in sufficiently with existing tariff regimes for other power sources to be acceptable to both the purchasers and regulators of power in Pakistan (i.e., principally WAPDA, NEPRA and PPIB) through external support for renewable energy tariffs. All the legal instruments and licensing procedures applicable to wind power generators have been drafted and agreed with key stakeholders. These completed instruments and procedures include Power Purchase Agreements (PPAs), Implementation Agreements (IAs), Power Dispatch Agreements (PDAs) and Letters of Support (LoS)—as well as reporting requirements and any other documentation necessary to set up and operate a wind power plant. A range of incentives introduced by the GoP that enhance the attractiveness of investing in wind power, and sources of potential finance, on competitive terms,	A tariff regime applicable to wind power producers is in place. This removes major uncertainties and clearly lays down parameters for potential new entrants into the business. It also balances the need to incorporate returns sufficiently attractive to attract potential investors to wind power generation with the necessity to conform sufficiently with existing power industry tariffs. The legal instruments and licensing procedures applicable to wind power generators have been drafted and agreed with key stakeholders. This significantly reduces the time and effort that needs to be expended on this process by entrepreneurs interested in investing in wind power in Pakistan. Sufficient financial incentives are in place to make the returns to potential investors in wind power in Pakistan attractive, relative to the risks involved. Also, the potential sources of funding are lined up and primed such that hurdles to fund raising for well conceived wind power projects by credible sponsors are reduced to manageable levels.

Output	Baseline	Alternative	Increment
		lined up from international agencies and local financial institutions. The incentive package offered to potential investors could incorporate a whole range of measures, including exemption from government income taxes and import duties, making finance available on concessionary terms, production incentives and environmental credits. This incentives package has a major influence on the economics of wind power generation in Pakistan, and is a key factor in facilitating evolution of a tariff regime that meets all the conflicting requirements outlined above.	Incremental Cost: (Baseline – Alternative)
	Cost: US$ 0	Cost: US$ 0.50 million	Cost: US$ 0.50 million GEF: US$ 0.50 million
Output 2. Project Facilitation for private sector investment in WE enhanced (PPIB/AEDB): Enhance the capacity of the Private Power Infrastructure Board (PPIB) and the Alternative Energy Development Board (AEDB) to provide a 'one-window' facility to private investors interested in setting up renewable energy-based power projects.	No capacity building or training in alternative energy projects undertaken at the PPIB. This means that the institution is ill equipped to play any role in promoting wind power (or other renewable energy projects) and facilitating progress for potential investment projects in this sector.	The PPIB/AEDB allocated primary responsibility for liaising with potential investors, proposing and promoting the incentives packages, providing comprehensive information on what is required to obtain a wind power license, processing project applications for approval by the GoP and all relevant line agencies, and steering developers through the required regulatory hurdles. This entails the provision of a number of additional resources at the PPIB/AEDB to undertake the above, and some training for these resources to ensure that they are properly equipped t undertake the tasks required of them. In addition, the bidding, tendering, and evaluation process and documentation for	The PPIB/AEDB is equipped to play a valuable role in smoothing the path for potential investors in renewable energy in Pakistan, by providing a clear outline of what is required as well as some assistance in achieving this. This would allow the PPIB/AEDB to play an important role in attracting investment to the sector.

Output	Baseline	Alternative	Increment
		the Pasni wind power project proposed under Phase 2 will be prepared for inviting IPP solicitations.	Incremental Cost: (Baseline – Alternative) Cost: US$ 0.50 million
	Costs: US$ 0	Cost: US$ 0.50 million	GEF: US$ 0.40 million GoP: US$ 0.10 million

Output	Baseline	Alternative	Increment
Output 3. **Wind map of selected areas, with detailed wind resource assessments for commercially promising micro sites in the coastal areas (and possibly other areas if results from PCRET studies show large potentials):** Ensure the continued monitoring, collection and storage of data currently being undertaken for the proposed wind farm site at Pasni. Extend this exercise to a range of other potential wind farm sites along the Makran coast.	The collection and analysis of wind data from the site at Pasni that is being undertaken under the GEF PDF 'B' grant comes to a halt with the end of the currently available financing. Lack of standardized long term data for the Pasni site and other promising locations on the coast means that no detailed assessment is made of the potential for wind power generation at specific potential project sites. Evaluation of the viability of the Pasni site during the detailed engineering and design phase is, therefore, less reliable. The chances of replication elsewhere in the area are also reduced. Cost: US$ 0	Twenty months of continuous and properly collected wind data (begun in early 2002, as part of the initial feasibility study) is available for the proposed wind farm site at Pasni. The process of extending data collection at this and other potential wind farm sites along the Makran coast has also been started. This facilitates a more refined and reliable assessment of the viability of the proposed project at Pasni during the detailed engineering and design phase. It also makes possible an initial assessment of the extent the Pasni project can be replicated elsewhere in the area, as well as identifying suitable sites for this purpose. Cost: US$ 0.9 million	Valuable data on wind patterns and strengths for the Makran region in Pakistan, and on which the assessment of the feasibility of wind farms depends, has been properly collected and stored and is available to potential investors. This removes the necessity for them to expend their own resources in identifying promising sites and collecting the data themselves, and therefore removes a significant barrier to attracting investment in the wind power projects. Incremental Cost: (Baseline – Alternative) Cost: US$ 0.9 million GEF: US$ 0.6 million GoP: US$ 0.3 million
Output 4. **Provincial and national capacity to manufacture (elements of), install and operate commercial grid-connected wind energy facilities:** Build domestic expertise in designing, setting up and operating wind measurement and power projects. Assess the	No efforts made to build domestic capacity to design, build and manage wind farms and their component equipment. This increases the difficulties and risks associated with any proposed wind projects, and makes them overly dependent on expensive foreign expertise and materials. It also makes these schemes difficult to sustain on a long-term basis. No assessment of the potential to promote the domestic manufacture of wind farm components is undertaken. The opportunity to kick start a brand new local industry is	Training of selected local personnel undertaken to achieve transfer of wind energy-related technology. This training to include the necessary skills to select, implement, and operate wind measurement and wind power equipment. This training could include both short intensive courses and more specialized longer-term courses sponsored through engineering schools and universities. The potential for local fabrication of key components for the demonstration and subsequent wind farms is assessed,	A degree of local wind energy related expertise created which helps to facilitate expansion of this technology across the country, whilst also reducing the both the risks and costs associated with doing so. The assessment of the potential for local fabrication of key components required for wind power generation may reveal that several components could be made locally—with a small investment in training and retooling. This would significantly reduce both

Output	Baseline	Alternative	Increment
potential to undertake local fabrication of at least some of the key components required for wind generation, and outline what additional steps would need to be undertaken to broaden this range of domestically fabricated items.	missed. All or most of the components for any wind farms that are built have to be sourced externally—which removes a major source of potential cost reduction. Cost: US$ 0	including those items that could potentially be manufactured with relatively modest additional investment in training or retooling. This assessment is based on detailed technical specifications prepared by international specialists. It makes possible some evaluation of the potential to reduce the costs of both constructing and operating wind turbines by using domestically manufactured content, and facilitates technology transfer. It also helps promote the development of a parallel small-scale windmills for community and household applications countrywide. Cost: US$ 0.50 million	the cost of initially installing the wind farms as well as reducing O&M costs. It also has the potential to initiate a new business area, increase acceptability of renewable energy technologies, and expand local employment, income and industrial growth. Incremental Cost: (Baseline – Alternative) Cost: US$ 0.50 GEF: US$ 0.30 GoP: US$ 0.20
Output 5. Clearing house mechanism for awareness raising and dissemination of wind energy information to private developers, public sector, academic sector and civil society: Enhance the capacity of the Pakistan Council of Renewable Energy Technology (PCRET) to take on the role of a market facilitation organization, responsible for providing	No change made to the PCRET's current capacities and responsibilities under the Ministry of Science and Technology. PCRET, therefore, remains primarily focused on micro hydel and biogas applications with little understanding of commercial-scale wind energy technology or capacity to facilitate its promotion and marketing.	Additional resources, training and information on wind technology related subjects provided to PCRET, so that it undertakes the vital role of an effective market facilitation organization promoting interest and disseminating information about the country's wind energy market and renewable potential. Important activities that could be provided by PCRET in this role include: market research, data and information dissemination, technology promotion, user education, business development and facilitation, training and technical assistance, consulting services, financing, policy advocacy or advice, networking, partner matching and general awareness building.	A valuable body created through which to focus collection and dissemination of a broad range of wind-related information and expertise. It also has the added advantage of giving primary ownership and responsibility for wind energy promotion in Pakistan to an existing organization specifically created to promote renewable energy, thereby strengthening the existing institutional infrastructure and avoiding potential conflicts and duplication of roles.

Output	Baseline	Alternative	Increment
the institutional support necessary for attracting and facilitating stakeholder and commercial interest in the country's wind energy market, and proactive promotion of wind energy related projects in general.	Cost: US$ 0	Cost: US$ 0.62 million	Incremental Cost: (Baseline – Alternative) Cost: US$ 0.62 million GEF: US$ 0.50 million GoP: US$ 0.12 million

Output	Baseline	Alternative	Increment
Output 6. Financial instruments for sustainable grid-connected wind energy development:	Currently there are no specific financial and economic instruments in place or planned to facilitate commercial grid-connected renewable energy in Pakistan	The relevant financial and economic instruments, including a 'green tariff' fund, will be analyzed by experts and situated within the current enabling and future enabling framework, so as to come up with the most appropriate menu of suggestions for immediate applications within this project so as to promote the pilot commercial wind IPP in Pasni as part of the possible conditions given to the successful bidder. In addition there will be instruments that can be adopted within the wider framework of advancing the menu of support alternatives for RE.	A valuable body created through which to focus collection and dissemination of a broad range of wind-related information and expertise. It also has the added advantage of giving primary ownership and responsibility for wind energy promotion in Pakistan to an existing organization specifically created to promote renewable energy, thereby strengthening the existing institutional infrastructure and avoiding potential conflicts and duplication of roles.
	Cost: US$ 0	Cost: US$ 0.50 million	Incremental Cost: (Baseline – Alternative) Cost: US$ 0.50 million GEF: US$ 0.50 million
Output 7. Mainstreaming Renewable Energy: Help build the capacity to undertake energy planning and policy formulation that takes proper account of the potential for renewable energy generation in	The GoP continues to emphasize the potential for renewable energy power generation in power development scenarios. However, without the required knowledge and skills within policy-making bodies at both the federal and provincial levels, tangible progress in translating policy objectives into actual plans for renewable energy development fail to materialize. Attempts to review and improve the power industry's institutional and	The capacity of federal and provincial government to undertake energy planning and policy formulation that takes proper account of the potential for wind power energy generation is much enhanced. Methods of operation which adopt proper 'least-cost' and 'avoided-cost' planning in resource acquisition, reflect the environmental advantages that renewable energies have over the thermal equivalents, take account of	Both federal and provincial governments are better equipped to assess the benefits and costs of wind power and weigh it up against the fully coasted fossil fuel alternatives. This is likely to encourage policymakers to integrate wind power and other renewable energies into energy policy packages, and create a more level playing field where renewable energies can

Output	Baseline	Alternative	Increment
general and wind power in particular, at both the federal and provincial levels. As part of this effort, establish a technical assistance program for policymakers, utilities, regulators and institutions responsible for promoting renewable energy sources in Pakistan.	regulatory framework will continue as in the past. However, without a coordinated and sustained effort, backed up by a properly structured and focused training program, little meaningful integration of renewable energy in the national planning process can be expected. Cost: US$ 0	transmission and distribution costs as well as the reliability of different power sources, and reflect the comparative financial risks associated with different resources are all in place. This should mean that published energy policy confirms the commitment of the GoP to renewable resources, and properly integrates renewable sources into the national energy mix—with specifically articulated and time-bound targets for the proportion of local and national energy coming from renewable energy sources. A technical assistance program for policymakers, utilities, regulators and institutions responsible for promoting renewable energy sources in Pakistan is established. This program increases awareness, planning skills and understanding of renewable energy sources and associated technologies. Cost: US$ 0.30 million	realistically compete as an alternative supply of power. The technical assistance program for key stakeholders involved in the power industry in Pakistan increases awareness, planning skills and understanding of renewable energy sources. This raises the capacity of these stakeholders to incorporate renewable energy targets in national energy supplies and assess renewable energy projects relative to conventional alternatives. It is also likely to make them more proactive in supporting individual renewable energy projects in meeting overall renewable energy policy targets. Incremental Cost: (Alternative – Baseline) Cost: US$ 0.30 million GEF: US$ 0.30 million

Output	Baseline	Alternative	Increment
Global Environmental Benefits[15]	None	Estimated direct reduction in carbon dioxide-equivalent emission levels of up to 89,000 tonnes per year, equal to 1.77 million tonnes over the 20-year lifetime of the proposed wind project However, the ultimate reduction in carbon dioxide emissions will be multiples of the above estimates (as much as 9 million tonnes) —if the proven success and viability of the Pasni pilot leads to its replication elsewhere along the Makran coast. Long term, there is further replication potential elsewhere in Pakistan.	
Domestic Benefits[16]	Additional power provision helps to stimulate the economy in the local area around the proposed plant by meeting latent demand for electricity, which is currently being neglected.	Local and regional air pollution reduced, especially particulates and SO_X. Savings in diesel fuel of up to 14,664 tons per year. Reduction in financial burden on the national economy of importing, processing and transporting the above fuel shipments. Removal of the foreign exchange costs associated with purchasing this fuel.	

[15] Note that these estimates refer mainly to the expected phase 2 of this project since phase 1 is expected to remove the main barriers currently hindering commercial wind developments in Pakistan, and the initial expected commercial plants will only come on line within phase 2 and even beyond it in terms of the total replication effects.

[16] Same comment as above in terms of expected domestic benefits.

Output	Baseline	Alternative	Increment
		Alleviation of the physical burden on the national infrastructure (e.g., ports, pipelines, road and rail transport, handling and storage facilities) imposed by having to import fuel.	
		Greater diversity of fuel supply and reduced dependence on variable oil import supplies and prices.	
		Eventually, potentially lower electricity costs resulting from the introduction of more competition into the power generation market.	
		Power generation cost reductions, allowing subsidies to be reduced and WAPDA resources freed up for better system investments.	
		Potential for the cultivation of a brand new domestic industry—as an increasing number of the components required for wind power generation are manufactured domestically.	
		Potential for stimulating the economy in the local area around the proposed plant—by meeting latent demand for electricity which is currently being neglected.	
		Project contributes directly to GoP objectives of poverty alleviation, social development and rural electrification—by providing a ready source of power in a remote location.	

Output	Baseline	Alternative	Increment
		This has the potential for direct benefits, such as the promotion of industrial and economic activity, increased employment and higher income levels. It can also contribute indirectly by improving the quality of basic social services in the area that are dependent on steady supply of electricity, such as health facilities.	
Costs	Baseline Costs	Alternative Project Costs	Incremental Costs
		US3.82 Million	US$ 3.10 Million (GEF)
			US$ 0.72 Million (GOP)
	Total: US$ 0	Total: US$ 3.82 Million	Total: US$ 3.82 Million

Annex B: Project Logical Framework

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
1. Development Objective (includes phase 1+2)			
The annual projected growth rate trajectory of GHG emissions from fossil fuel-fired power generation is reduced through the exploitation of Pakistan's wind energy resources for electricity generation, and contributes to the sector development objectives.	Indicator: Reductions in CO2 emission growth rates, due to grid connected wind farm installations within the energy mix. Targets: 1) Mid Term (2007): By end of Phase 1, agreements for the construction of a wind energy farm that will deliver a total of 1.7 million tons of CO2 reductions over its operational life time. 2) End of Project (2010): By end of Phase 2, contracts for wind farms with a total CO2 life time plant reduction capacity of 9 million tons will have been agreed to be installed	Documentation of wind energy agreements with associated calculations on CO2 (from PIU and in site specific agreements). Internal data from PPIB, WAPDA and AEDB. Growth rates of additional wind capacity installed with associated estimates of financial and economic sustainability (from official documents published by PPIB, WAPDA and AEDB)	Sufficient national and institutional budgetary allocations allocated to support RET development. No additional support schemes and/or subsidies to fossil fuelled grid development projects. Monitoring activities under the project on power generation are fully supported and implemented, and successful capacity building to institutionalise such processes are finalized
2. Immediate Objective	**(includes phase 1+2)**		
Sustainable business model for grid-connected wind generation in Pakistan, facilitated by targeted barrier removal and the operation of the first model wind IPP/s	Indicator: Number of grid connected wind farm construction permits issued by GOP Targets: 1) Mid Term (2007): By end of phase 1 a minimum of 3 permits issued (constituting between 30-60 MV) 2) End of Project (2010): By end of phase 2, a minimum of 6 permits issued (constituting between 60-150 MV) Indicator: Numbers of PPA signed by developers for grid connected wind power Targets: 1) Mid Term (2007): By end of phase 1 a minimum of 1 PPA have been signed 2) End of Project (2010): By end of phase 2, a minimum of 3 PPA have been signed	Information generated by the M&E activities of the project and the relevant government institution such as PPIB and WAPDA. Data from PPIB and WAPDA	Insufficient changes in public framework for wind energy, such as favourable enabling policies, planning and implementation conditions (contracts, tariffs, finance and technological support). Electricity demand will grow accordingly so as to accommodate additionally generated wind energy. Technological transfer and adaptation to support cost reduction processes for grid-connected wind Political instability and operational funding mechanisms to support a premium feed in tariff scheme or other market based support mechanisms.

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
3.1 Wind Power Policy Package (Tariff regime, policy and incentives package and legal framework that are conducive to grid-connected IPP)	Indicator: New specific government wind power policy and incentives package Target: New specific government wind power policy and incentives package (fiscal, tax, tariff and other instruments would be included) in place by 2007. Indicator: Revised and detailed planning targets for the introduction of wind and other RE within the national energy mix Target: Revised and detailed planning targets for the introduction of wind and other RE within the national energy mix in place by 2007 Indicator: Legal and regulatory instruments that facilitate grid-connected private wind ventures Target: Legal and regulatory instruments that facilitate grid-connected private wind ventures approved by the GOP through appropriate mechanisms, by year 2007 Indicator: Competitive bulk wind tariff regime (appropriate benchmarks will be developed so as to monitor progress) Target: Competitive bulk wind tariff regime established by 2007	In published format (WAPDA, PPIB, MOWE) after being approved by the relevant governmental institutions National level documentation from the Energy Wing of the National Planning Commission and WAPDA From the approved grid wind energy IPP projects and other GoP policy/program proposals for reform of tariff issues for wind IPP (NEPRA, PPIB). Specific M&E reports conducted by the PIU will consolidate this information. Published legal and regulatory documents on revised instruments (Min. of Water and Power, PPIB, WAPDA)	Continued high political support within the GOP and clear institutional commitments and division of labour according to comparative advantages between the sectors of energy and environment

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
3.1.1 Conduct underlying studies and consultancies to produce reform proposals to achieve a competitive enabling environment for grid-connected commercial wind energy, focusing on policy, contractual, tariff and supporting legal instruments	Finalized enabling environment proposals (on policy reform, contractual, regulatory and legal aspects of WE) by early 2006	Proposals procured and delivered according to schedule Success can be measured in the drafting process of the final proposals for reform (i.e. in terms of how well the information and its form can be adopted directly into reform proposals)	Availability of required information and continued dedicated staff to ensure cooperation from concerned parties within the GOP Quality of background studies and consultancies turn out to be determining factors to produce high quality reform proposals
3.1.2 Technical assistance to support process of awareness building and training of key government sector personnel in areas related to the reform proposals for wind energy	At least 50 staff in pre selected government institutions trained in the theory and lessons learned of wind energy reform by end of 2005 At least 4 key government institutions with newly added considerations of wind and RE in their operational strategies and technical capability by mid 2006	Minutes of all stakeholder workshops and training sessions held Monitoring by the PIU in coordination with responsible government institutions and AEDB	Higher turnover rates within GOP on different levels may endanger the continuity and sustainability of these efforts.
3.1.3 Draft the final agreed upon versions of wind policy measures, wind power tariff structures, grid integration measures, legal and licensing procedures	Content and quality of reform proposals formally endorsed by key institutions from related sectors within GOP by end of 2005.	Minutes from consultative meetings, PSC and other relevant venues for wind and RE with broad institutional representation	Confirmed and sufficient budgetary allocations and/or revenue raising mechanisms to sustain these measures
3.1.4 Negotiation of proposed enabling environment reforms for grid-connected commercial wind energy	Competitive enabling conditions formally agreed for the pilot grid-connected IPP project by mid 2006 Complete proposal for a competitive enabling environment for grid-connected wind energy IPP approved by relevant GOP	Signed PPA contract for either the project wind IPP and/or other wind IPP's, together with other published government documents that detail such enabling conditions Published government decrees that confirm the changes in enabling conditions within the	Political support established and maintained from different interest groups in parliament, government and private sector

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
	institutions by 2007.	different areas of reforms envisioned	
3.2 Project Facilitation for private sector investment in WE enhanced (PPIB/AEDB) PPIB/AEDB will be able to provide a one-stop window facility to private sector investors on commercial WE and on-grid projects	Indicator: Number of queries (concerning bidding, tendering, evaluation and information needs and on regulation and legal framework) satisfactorily responded to from interested national and international wind developers Target: By end of 2006 a minimum of 20 queries from serious wind developers on an annual basis, responded to in a satisfactory manner Indicator: Capacity of dedicated PPIB/AEDB officials to perform commercial wind energy project evaluations, leading to the negotiation of PPA Target: By 2007, a capacity to process up to 10 IPP applications and the associated PPA work for wind energy per year	PPIB/AEDB CLIENT SURVEYS AND INTERNAL DATA ON QUERIES AND RESPONSES-ATTENTION GIVEN Information on time dedicated to advise on grid WE PPIB and External experts to evaluate the installed processes and capacities of staff to process wind energy IPP's and draft PPA's	Continued growth trend in international wind industry/investments and specifically South Asia oriented companies/investments
3.2.1 Draft and finalize relevant documents on the bidding, tendering and evaluation process for on-grid WE projects	Documents drafted, finalized, and approved by the relevant bodies of the GOP by end of 2006	Documents approved and being utilized (feedback from end users on quality of documentation, surveys to be handled by PPIB/AEDB)	Sufficient political support and agreement between key government agencies on process and conditions
3.2.2 Targeted training of PPIB/AEDB staff on WE	At least 10 Staff in PPIB/AEDB with specialized knowledge on WE and with work time in their TOR and work plans dedicated towards WE by end of 2005	Reports and dialogue with PPIB/AEDB (PIU)	
3.2.3 Setting up of the required systems and	Systems installed and operating as an integrated	Supporting documentation and reports from	

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
infrastructure in PPIB/AEDB to facilitate commercial queries on WE	part of the one-stop window facility at PPIB/AEDB by end of 2005	PPIB/AEDB	
3.3 Wind map of selected areas and detailed wind resource assessments for commercially promising micro sites in the coastal region	Indicator: Regional wind map according to recognized international standards Target: Finalized by end of 2006 Indicator: Micro site measurements conducted/facilitated as standalone or in partnership with interested parties Target: A minimum of 5 micro sites measurements initiated in different promising regions in Pakistan by 2007	Published wind maps together with a dynamic information setup, available on request and online (PCRET sources and website) Officially available information, possibly with certain restrictions and uses as decided by the GoP to ensure impact on commercial development	Improved information quality and sharing between key line agencies and stakeholders within the GoP with regards to a joint and coherent wind map and overall wind data dissemination
3.3.1 Continued hub-height wind resource mapping and assessment at Pasni and other regional sites	Consistent data measurements in place for a minimum of 5 promising wind micro sites in Pakistan by end of 2006	Availability of updated site-specific wind data at the proposed information centre (with the idea and funding leveraged to be taken over sufficient time spans, such as 2 to 3 years)	Interruption by war and/or the security situation in the different areas that would affect the ability to collect and monitor information as needed
3.3.2 Training and establishment of local capacity to assess and evaluate potential wind farm sites	**150 LOCAL STAFF TRAINED IN WIND FARM MICRO SITING, DATA COLLECTION AND ANALYSIS BY END OF 2006** 50 staff of central GOP staff with capacity to evaluate promising future wind farm sites (in key line agencies)	Documentation of the training and provision of wind analysis software licenses Information from PIU and AEDB and other institutions information	Staff turnover will be kept low and trained staff will find critical mass of related work/employment

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
3.4 Provincial and national capacity to manufacture (elements of), install and operate commercial grid connected wind energy facilities	Indicator: Capacity of national/local companies to be involved in the manufacturing, procurement and assembly of components of grid connected wind facilities Target: At minimum of 2-3 national-local manufacturers with capacity and commercial interest to be involved in the manufacturing (of elements), procurement and assembly of grid connected wind facilities Indicator: Private company capacity with regards wind energy platform operation and maintenance. Target: A minimum of 50 technical and professional staff trained on grid connected wind energy and its operation and maintenance by end of 2006	Project reports, minutes from workshops, study tours and cooperation agreements signed with key wind energy institutions.	Local and national manufacturing of wind parts, turn out to be a competitive option for collaborating national and international contracting parties.
3.4.1 Enhancement of local manufacturing and technical capacity for the construction and operation of wind farms	Assessment of existing wind power components that can be manufactured/ procured domestically to be done by end of 2005 Additional international assistance in upgrading specific technology skills and capabilities, delivered by end of 2006	Data on facilities and components, along with costs, that can be supplied locally to international specifications Technology-sharing license agreements and partnership arrangements with international wind power equipment vendors	Competitiveness of manufacturing wind parts compared to alternatives for local and national companies.
3.4.2 Sustained commitments from the government and the private sector to promote and support the development and application of wind energy resources for	The government formally commits portion of the annual tax revenues from wind energy system owners for supporting wind energy technology development, starting in 2007	Official copies of agreements (in principle)	Political climate continues to develop positively with regards to inducing RET and wind energy in specific

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
electrification	The wind energy system owners/IPPs commit portion of their gross revenues each year for supporting wind energy technology development starting in 2007	Official copies of agreements (in principle)	
3.4.3 Technical training for operators of wind energy generation systems	Completion of training courses by end of 2006 for a minimum of 50 staff and 5-7 companies conducted by international consultants	Attendance at the courses Modules for the courses	Planned wind farms where operational skills will be required
3.5 Clearing house mechanism for awareness raising and dissemination of wind energy information to private developers, public sector, academic sector and civil society	Indicator: Referrals and information given to the targeted stakeholders Target: At least 100% growth in yearly numbers of referrals satisfactorily responded to be 2007	Documentation and surveys from PCRET and other involved GOP institutions Specific M&E done by designated specialist within the PIU	PCRET maintains its mandate, role and receives an increased budget allocation within the GOP institutional set up
3.5.1 Provision of easily accessible market services and information to private investors interested in setting up wind power projects	A one-stop shop is in full operation at AEDB/PCRET by 2006 (with established rating and feedback mechanism applied to each client, benchmarks developed to monitor and evaluate progress)	Organizational structure of the one-stop shop Questionnaire and reporting on client satisfaction	
3.5.2 Establishment of a Wind Energy Information Centre to work as integrated clearing house for wind energy-related information	Information Centre providing service on WE matters established at AEDB/PCRET and functioning by 2006, with a business plan, cost recovery strategy and a declining part of its staff and operational costs covered by the GEF.	Official inauguration of the Information Centre Information generated from the Centre and data from GoP	**INFORMATION DEMAND REGARDING WE IS SIGNIFICANT TO SUSTAIN THE DEVELOPMENT AND EXPANSION OF SUCH A CENTRE ON AN INCREASINGLY SELF SUSTAINED BASIS**
3.5.3 Dissemination of specific potential wind farm sites and corresponding wind speed	Mechanism and capacity for site assessment and wind data collection and analysis in place by 2006, with a positive trend in terms of utilization by	Operational arrangements for data collection, handling, processing, analysis, and dissemination in place and inauguration of	Protocols, formats and standards for wind speed measurements as per industry requirements

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
data	private IPP developers. A monthly newsletter and a website established and operational by end of 2006	wind speed and resource assessment service Survey among identified private sector companies on utilization of wind data, conducted by the PIU. Subscription to/circulation figures of the newsletter and site hits	Quality of information provided/available
3.5.4 Education and awareness raising about wind energy	An RE education program developed and approved by the Ministry of Education and other relevant institutions by 2007, targeting different audiences, such as technical schools, regional universities and other levels	Official documents and confirmation from MOE and AEDB. Modules of education program developed and in operation in targeted segments Circulation of different information sources	Wide ranging participation of technical and educational institutes, public and private industry, and other potential beneficiaries
3.6 Financial instruments for sustainable grid connected wind energy development	Indicator: Government commitment towards a production based feed in tariff premium for wind energy, together with sustainable funding source options Target: By end 2006 formal decree or legal commitment from GOP towards the availability of a premium feed in tariff for wind energy ventures Indicator: Financial and investment institutions that plan to/or are developing instruments for WE and RET in general Target: By end of 2006 a minimum of 2 financial/investment institutions have developed or opened up specific and viable financial instruments	Formal decree, law or relevant legal commitment from GOP on the tariff premium. Official information on budgets and funding sources. Survey conducted by PIU as part of finance and investment sector involvement in the project	Specific budgetary allocation mechanisms and/or other income generating facilities, established and in operation

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
	for RE and WE in general.		
3.6 .1 Establish criteria and methods for provision of sustainable financing options to investors	Set of criteria and methods developed by end of 2005	Official ownership and mutual ownership of the criteria	
3.6.2 Financing scheme for wind energy designed and developed, e.g., 'Green Tariff Fund', enumerating eligibility criteria for financing	Consultations conducted for recommendations/ consensus on mechanics for WE financing schemes by end of 2005 Clarification of needed documentation of mechanics and eligibility for WE financing schemes by early 2006 Negotiation process with TA and support needed, towards political and financial commitment to formally commit to the premium feed in tariff scheme by end 2006	Minutes of meetings/consultations Official announcements/ inauguration of the schemes Documentation of the mechanics and criteria Documentation on the eligibility criteria	Sustainable management and replenishment of the fund Continued interest and cooperation from the finance sector
3.6.3 Awareness raising and training on the setup and effective utilization of the recommended financial mechanisms to promote commercial WE	4-6 workshops, training and WE campaigns conducted A minimum of 10 relevant financial and investment oriented institutions in Pakistan participated in the training/or awareness raising events by end of 2005	Workshop reports and PIU reports on awareness campaigns (PIR)	
3.7 Mainstreaming Renewable Energy Build capacities of key agencies and staff within institutions undertaking energy planning and policy formulation	Indicator: Integration of RE into the overall national energy plans and energy capacity scenarios Target: By 2007 specific and time bound targets for RE within the future energy capacity and production mix will be published in key	Workshop reports and information collected directly by PIU Published GOP energy policy and planning documents	Overall political changes within GOP conducive to integrating RET into programs and support mechanisms

Project Strategy	Success Indicators	Means of Gauging Success	Assumptions/Risks
	GOP planning and program documents Indicator: Government staff in key institution with relevant capacity to project and target role WE and other RE within the energy generation capacity Target: A minimum of 10% of staff from key government agencies trained by 2007 on potential and role of WE and other RE within national and regional energy mix		
3.7.1 Design of broad-based technical assistance program for policymakers, utilities, regulators and public institutions within GoP responsible for promoting RET use	Finalized TA program agreed between all relevant parties by end of 2005	TA program document and associated agreements	
3.7.2 Implementation of broad-based technical assistance program for policymakers, utilities, regulators and public institutions within GoP responsible for promoting RET use	A minimum of 80% of all participants from invited institutions complete the developed courses/workshops by end of 2006	Workshop reports	Sufficient continuity of staff to maintain effects of CB
3.7.3 Follow up with course participants and their respective institutions on mainstreaming of RET within their strategy and policy documents (short term consultancies)	A minimum of 80% of the institutions trained where strategy and policy documents are produced with RET integrated in a new and expanded manner by 2007	Reports on progress towards mainstreaming into different energy policy and planning documents (PIU)	

Annex C (1): STAP Review of the Draft Project Document and Executive Summary

Sustainable Development of Utility-Scale Wind Power Production

Herman Snel

December 2003

- **Introduction and Framework**

The draft Project Document (Prodoc) for the UNDP/GEF project proposal: "Sustainable Development of Utility-Scale Wind Power", is reviewed here. This project is designed to initiate the development of large-scale wind energy implementation in Pakistan, by creating an enabling environment for this purpose (Phase 1), culminating in the design and implementation of a 15 MW grid-connected wind farm (Phase 2) close to the town of Pasni, in the coastal region of Makran.

The project description [1] was received in the form of an electronic document with filename: *Prodoc20122003.doc*, last changed on 20-12-2003 at 9:01 p.m. It is organized in the form of 148 numbered paragraphs and three Annexes. This review and other reviews, together with the respective responses, will later be added in the form of four more annexes. At present, a table of contents showing the organization of the paragraphs in sections and sub-sections is missing. It is assumed that this will be added in the final document, to increase the readability of it. This review will refer to the paragraph numbers

The total project covers a period of five years. According to paragraph 90, the first two years will be dedicated to Phase 1, followed by 2 or 3 years for Phase 2, upon a positive outcome of a 'go no-go' decision after the termination of Phase 1. It is observed that the Prodoc does not clearly define measurable criteria on which to base this decision. Paragraph 90 mentions the need for these criteria (benchmarks), but to this reviewer's opinion, they should be defined before the start of the project.

The project proposal follows on the execution of earlier PDF 'A' and PDF 'B' projects, as can be inferred from the text of the Prodoc at several locations (e.g. paragraphs 43 and 44). However, no clear and concise summary of objectives and results for these preceding project phases can be found in the Prodoc. It would be very helpful to add this (albeit in the form of annexes) so that the rationale of the present project, building on the results obtained in the previous phases, can be better evaluated. Background material from the 'B' phase is available at the internet site: http://www.un.org.pk/undp/energy/ongoing-proj.html#5th. Much of this material is of high quality and has been of great use in the review process

As regards the organization and work plan of the project, the document in some places could be improved in clarity and in consistency. For instance: there is no one-to-one correspondence between the activities mentioned in the table of paragraph 82 and the activities mentioned in the Incremental Cost Matrix of Annex A, the table lumping some of the activities (referring to them as IC activities, without further explanation) and using a different nomenclature. The elements mentioned in the Structure for Project

Implementation (Exhibit 2 of paragraph 120) do coincide in name with the 'IC activities' but IC activity 6 is missing from this table. This does not improve the readability of the Prodoc and it is suggested to unify names of activities, and their definition, throughout the document. Finally, a work plan including a time line, also indicating the mutual dependence of the various elements, their duration and sequence in time, is missing. This makes it difficult to assess if the program is realistic in the allotted time and impossible to evaluate the budget for Phase 1.

- **Scientific and Technical Soundness of the Project**

In order to clarify a number of critical issues, the project's final deliverable and some key figures are summarized and commented here.

a) The end result of the project should be a 15 MW wind farm connected to the isolated small Makran grid, which is operated with a number of Diesel powered generating units. According to the background document [2] (Exhibit 2) the presently installed generating capacity in the Makran grid is approximately 60 MW, operating currently at a derated capacity of 38.54 MW. An additional 5 MW in diesel generation is being installed at this moment. The 15 MW wind farm will represent 35% of the available diesel capacity. In fact the grid should then be considered as a hybrid, wind-diesel grid. This is also acknowledged in the background report: Development of Technical Specifications [3], chapter 3.8.

b) The peak demand on the grid is estimated to be 28 MW by the time the wind farm is in operation (chapter 6 of [2]). This may mean that in the low demand situation, the actual demand is lower than the nominal power of the wind farm. This in itself is not a problem, since the wind resource is marginal and nominal power will be reached most likely in 1 to 1.5 % of the time, at an assumed nominal wind speed of 11.5 m/s. Nevertheless, for the environmental impact, and for the economical analysis, it is very important to obtain a good idea of the match between production and demand. This should include matching diurnal cycles of wind power availability and of power demand

c) The measured wind resource at Pasni is marginal, at best. The effect of this is a relatively low capacity factor for the wind plant, estimated at 0.18 (paragraph 50). This in its turn results in a relatively high cost of energy, appreciably higher than the 0.04 to 0.10 $/kWh mentioned in Section 5.4.1 of [2], which is indeed the typical value range for applications in Europe and in the United States. In this respect it is interesting to compare the results of the cost study for the present project with results from a German study by DEWI, shown in figure 1 below. A load factor of 0.18 corresponds to approximately 1600 full load hours per year. The figure shows comparable costs to those calculated for this project. It is also clear that a better wind site, e.g. with 2200 full load hours, corresponding to a capacity factor of 0.25, will bring the cost within the interval mentioned above. Still wind energy can compete economically with the present cost of diesel power in the Makran grid, and even with new Diesel generating units if those were added. However, it is not possible to compete with the cost of energy generated from a combined cycle thermal plant. Although this type of

plant may not be suited for the small Makran grid, it should be considered in case the Makran grid were to be connected to the national grid

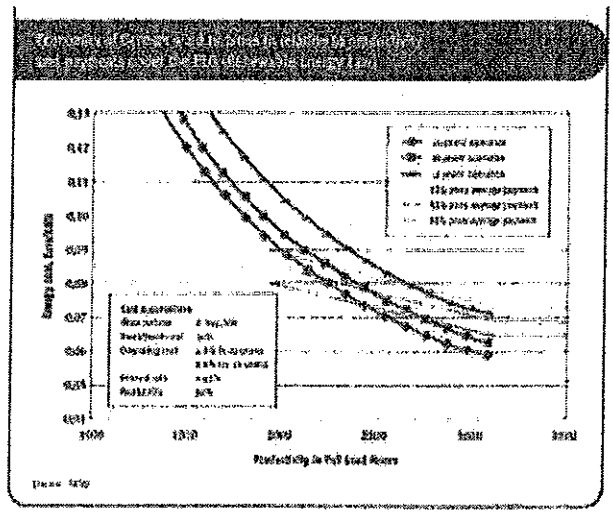


FIGURE 1. WIND ENERGY COST ESTIMATES FROM A DEWI STUDY.

Based on the above considerations and values, the following observations are made:

d) Site selection. Paragraphs 43 to 45 describe the site selection to have been based mainly on the existing infrastructure for grid connection at Pasni. Although this is an important aspect, the more important aspect of wind resource seems to have been somewhat less in the foreground. The following paragraphs (46 and 47) indicate that the wind resource at the measurement site is only marginal (5.5 m/s at 50 m of altitude). It is strongly suggested to continue the search for better wind sites in the region as part of the Phase 1 activities. See also h).

e) *Wind resource*. The analysis of the wind resource is described in background report [4]. The wind speed frequency distribution is only indicated in the tables 4.5 and 4.7 on a 1 m/s interval basis. A different background report [2] states that this frequency distribution was used in the estimation of the capacity factor of the wind power plant, given to be 0.18 (also in paragraph 50). It is not clear (because not mentioned in [2]) if array losses, availability and electrical losses are included in this estimation. Unfortunately, the analysis does not include the (standard) estimation of the Weibull parameters, which would have given an added systematic advantage. Especially the Weibull shape parameter is important to assess the resulting capacity factor.

f) Also in [4] an account is given of existing long-term measurements at the nearby airport of Pasni. Although the report states that correlation of these measurements with concurrent measurements at the Pasni site turned out to be very poor, the long-term measurements could have and should have been used to compare the airport measurements over the 15 months with the long-term average measured at that same station. This would give more certainty about the

relation of the measured values at Pasni to the long-term average wind speed at the Pasni site also.

g) What is missing is an analysis of diurnal cycles, both for the demand and for the wind power availability. Judging from the site specification at the shore, it is likely that a marked diurnal cycle is present in the wind speed. If peaks in this cycle coincide with peaks in the demand, it is likely that wind power can be absorbed when generated. However, if this is not the case, it is quite possible that wind power generation must sometimes be limited below the physically possible levels to maintain the balance between production and consumption, and the associated grid frequency stability. This would reduce the effective capacity factor even more. It is strongly recommended to add this study to Phase 1 of the activities proposed.

h) It is important to note that even with the wind resource considered, wind energy is economically competitive with diesel-generated energy (see c) and can (if offer and demand coincide) be used to replace diesel-based extension of the generating capacity, see [2]. However it must be kept in mind that if 60-80 MW of additional wind power would be added to the local grid (see e.g. paragraphs 91), it is almost certain that the produced wind power will very frequently be higher than the demand. Hence the local Makran grid must then be connected to the main grid to evacuate the power to other load centers. In that case wind energy cost must be compared with the cost of other generating options within the grid, for instance the combined cycle option mentioned in [2]. Note that Clean Development Mechanism (CDM) contributions could be used to lower the effective cost of wind energy. Nevertheless, replicability would depend on finding sites with better wind resources, see also c). In this respect it would be important to have information about the PCRET study mentioned in paragraph 7, in which wind resource measurements are planned (and in execution?) at 40 different sites in the country. It is quite possible that higher wind velocities resulting from the diurnal land-sea wind cycle can be found a few kilometers more land-inwards from the coast, and not at the coast line where measurements have taken place, see [4].

i) Background report [3] details the technical specifications for the wind turbines. Although this is not part of the Prodoc, an observation must be made regarding the requirement for IEC Class I approval in section 3.3.1 of [3]. The wind resource as established in [4] does definitely not call for a Wind Class I certified turbine, but rather for a class IV turbine. However class IV turbines are not readily available on the market, and it is suggested to specify a class III turbine (up to 7.5 m/s annual average wind speed), unless a better site is identified. Such a turbine, designed for a low wind speed region, will have a larger rotor for the same installed power, and result in a higher capacity factor than a Class I turbine. Again it is not clear what turbine characteristics have been used (not mentioned) in the estimation of the capacity factor.

j) Additionally it is important to mention that the type of wind turbine to be selected should have the implementation within a hybrid wind-diesel grid in mind. Possibly, modern options with IGBT based 'back to back' converters

could have a large advantage with respect to the need of reactive power, see also the requirements detailed in [3]. This then would lead to a variable speed turbine. In order to optimize the efficiency of the total system, it is strongly suggested to look into the possibility of an integrated control for the diesel and wind units, as mentioned in chapter 3.8 of [3], although this requires expertise and experience.

k) The wind farm layout considered in (among others) paragraph 44, should be further optimized with respect to predominant wind directions and wake interference. Two rows normal to the predominant South Westerly wind, would possible give less array losses; one single row (with larger turbines than those considered so far, say 1 or 1.5 MW) facing the South-West direction might be even more beneficial.

l) Some of the background studies, e.g. [2], are based on an assumed capacity factor of 0.3 instead of the value of 0.18 stated in the Prodoc. It should be checked if this large difference effects the conclusions of such studies in an important way.

In conclusion, to this reviewer's opinion, there are many aspects to consider before a firm decision should be taken about the implementation of the wind farm, the most important one being finding a site with a better wind resource. Apart from this, some actions described above can be carried out already, with the existing wind data, and perhaps additional data from the PCRET studies referred to in paragraph 7.

It is suggested that sound answers to these questions must be available, before taking a possible 'go' decision at the end of Phase 1. If it were clear already at this time, that no better wind resources are available, the project should be seriously questioned. In fact, as stated before, large-scale wind energy development on the Makran grid will require the grid to be interconnected to the National grid, for which a better resource is economically necessary.

- **Regarding the Barriers and Constraints Presently Existing**

Barriers and Constraints are dealt with in paragraphs 29 to 35 of the Prodoc.

Regarding the Institutional Barriers (paragraph 30) it is reassuring to see that the GoP has now created the Alternative Energy Development Board (AEDB, paragraph 104) to oversee and coordinate all activities in wind energy development, among other forms of renewables. At the same time, the PCRET seems to play an essential role also, but possibly more on the level of technology and implementation (?). Note that the proposed institutional framework for renewable energy in Pakistan in exhibit 3.2 of [6] does not mention the AEDB. It is essential for the success of any program in renewable energies, that there be a central agency to coordinate activities, in order to prevent a lack of clarity regarding the agencies responsible for certain decisions. It is assumed that the AEDB will have an important role in the Activities 1, 2, 5 and 7 described in paragraph 137, although this agency is not mentioned there. It is recommended that full clarity be given to all stakeholders where the ultimate responsibility lies for key decisions.

Another important barrier to be removed is the Technology and Information Barrier. The activities 3 and 4 of paragraph 137 should be utilized to the fullest extent to remove these

barriers. The background documentation resulting from the phase B activities shows high quality knowledge to be available in general energy subjects, but still some need for improvement in special wind energy expertise. It is recommended that in the work plan to be set up a detailed knowledge and technology transfer plan be designed, with complete clearness on who has to be trained when and how and for what purpose. It is also recommended that government agencies, private industry and engineering faculties of universities be important participants in these activities. Such a education and training program should start at the very beginning of the project to be effective.

- **Benefits, Relations to Goals of GEF and Regional Context and Replicability**

The introductory paragraphs of the Prodoc put the project in the framework of sustainable development, reduction of GHG emissions, cleaner air and regional socioeconomic development (paragraphs 1 to 7). This is entirely in keeping with UNDP/GEF policies. It is important to emphasize the concepts stated in the Prodoc, that access to energy is one of the several important items in a regional development plan. Obviously the (consumer) price of the energy is of importance to assure real access. For this reason also, it is important to identify wind power development sites with better wind resources than the one at Pasni.

The most direct environmental benefit of the project is the reduction of emissions of GHG, through energy generated by the wind power installed as part of the project, replacing diesel powered generation. The environmental impact assessment report [5], one of the background reports, is of high quality and very complete in addressing the environmental advantages and disadvantages of wind energy. It states a clear case in favor of the project, from the environmental point of view. It is interesting to note that for this specific case, in the desert like environment, the conservation of water (elimination of cooling water requirements) is an important fact.

Regarding the values of reduction of GHG emissions it is observed again that the estimations are made on the assumption that all wind energy that *can* be produced, can be consumed and hence *will* be produced. It is emphasized that the consequence of this, for further wind energy development in the same region, is the connection of the regional grid to the national grid, to enable the exportation of the energy to more load centers.

- **Sustainability of the Program**

Sustainability of the project and the wind energy program is addressed directly in paragraphs 99 to 101. The financial sustainability is discussed in paragraph 100. It is in this paragraph that the values of 14.0 to 8.8 US$ c/kWh are mentioned. In the accompanying table (Exhibit 1) these values are shown to be respectively: the base cost (14.0) and the cost(8.8) resulting from a higher capacity factor, a lower interest rate, a lower capital cost, a GEF donation of 3 million US$ and a payback period of 8 year instead of 7 year for the base case. According to this reviewer's opinion, the GEF grant is only a temporary incentive, although possibly partly replaceable by CDM schemes in the future. However, the only way to drastically increase the financial sustainability would be with a higher capacity factor, hence a better wind resource.

Another issue that is very important for sustainability is an added local content that can only be achieved with a build-up of local knowledge and use of local technology. Hence the importance of a well-structured knowledge and technology transfer program.

Paragraph 101 indicates the importance of the enabling environment, which must be a result of Phase 1 of the project, i.e. the first two years. This is indeed an absolutely necessary condition. Progress in this area should be made measurable before the start of the project and evaluated for the go no-go decision for the second Phase 2, see also paragraph 90. The monitoring and evaluation structures, described in paragraphs 108 to 110, are essential for the timely warning if established goals seem to be in danger of not being met.

- **Linkages Programs and Plans in the Region**

Connection of Pakistan's national grid to the grid of neighboring countries can have stabilizing effects on the total. It is strongly recommended that grid stability studies for various alternatives be done as part of Activity 4 of paragraph 137.

The wind energy program appears to be well embedded in the regional development program for the Makran coastal region.

In a larger context, it should be noted that both China and India have quite some experience in wind energy implementation on utility scale and that these experiences could be helpful for Pakistan, if so desired. Developments in India are mentioned in some of the background documents.

- **Degree of Involvement of Stakeholders in the Project**

The stakeholders are many, and described in many different paragraphs in the Prodoc. The database of foreign private sector interested parties in Appendix C of [7] needs urgent updating, since some of the companies mentioned there do no longer exist. This is the result (in part) of the dynamic wind energy scene, which makes frequent updating a necessity.

It is good to see that stakeholders are defined to include also the inhabitants of the Makran region. It is international experience that working together with neighbors of potential wind farms is essential for success, and can contribute to local employment.

- **Capacity Building Aspects**

Capacity building is central to Activity 4 of paragraph 137. It is reassuring to see that emphasis is made on capacity building within the private, industrial sector. Capacity building is also very important on the decision preparation level in the GoP agencies that will be involved. It is important to identify agencies, persons and training needs at a very early moment, possibly still before the start of the project, since a lot of the creation of the enabling environment will depend on government officials with sufficiently detailed knowledge.

- **Conclusions**

In this reviewer's opinion the program should take issue of the go no-go decision at the end of the first two years very seriously. Very important items are:

- the identification of better wind resources for higher capacity factors and lower energy costs;
- the (future) ability to export energy production that cannot be absorbed in the region to other load centers; and

- the measurable establishment of the 'enabling environment', including tariff structures and a local knowledge base. This should include the private sector and possibly engineering faculties of universities.

- **References**

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Identification of Existing Barriers to Wind Energy Use. Hagler Bailly Pakistan Report R3BA1WEP.

Identification of Policy framework and Possible Sponsors. Hagler Bailly Pakistan Report R3PF1WEP.

Annex C(2): Response by UNDP/GEF to STAP Review by Herman Snel

Introduction and Framework

1. Comment:

Add table of contents in project document.

Response:

Acknowledged.

Adjustment in Project Document:

Table of contents added after cover page.

2. Comment:

The criteria (benchmarks) for transition from Phase 1 (first two years) to Phase 2 (following three years) within the project, should be clearly defined before the start of the project

Response:

Broad procedural benchmarks and decision points can be identified in Phase 1 that can constitute a basis for proceeding with Phase 2. Detailed milestones will partly depend on some of the policy, tariff, and implementation framework to be developed and approved by GoP specifically for this purpose as an integral part of various IC activities and outcomes defined in Phase 1.

Adjustment in Project Document:

Additional text on verifiable milestones and transition modalities added to Project Implementation Arrangements in Section II. A set of immediate minimum prerequisites (to enable a 'go-no go' decision on Phase 2 to be made) have been identified, followed by intermediate milestones (as per current GoP IPP policy) required before project groundbreaking. Finally, long-term capacity building objectives determining the sustainability and future replicability of wind power in the country have also been listed.

3. Comment:

Add annex with summary of objectives and results of the 2 preceding pre feasibility phases (A and B), and insert references in relevant paragraphs (e.g. 43 and 44)

Response: Has been incorporated as a separate annex

Adjustment in Project Document: See Annex F in project document

4. Comment:

There should be just one structure and numbering of project activities within the relevant sections of the document (e.g. IC analysis, matrix, log frame)

Response: Alignment has been done throughout the document

Adjustment in Project Document: Various sections such as IC analysis, IC matrix (Annex A), LF matrix (Annex B) and in other relevant tables throughout both the Executive summary and the project document

5. Comment:

No work plan is included in the document

Response: An outline of a work plan has been added as a new annex

Adjustment in Project Document: Annex D in the project document

Scientific and Technical Soundness of the Project

6. Comment:

For the environmental impact and the economic analysis, it is very important to have a good idea of the match between production and demand. This should include matching diurnal cycles of wind power availability and of power demand

Response:

Diurnal load profiling and matching was not considered necessary at this early stage of establishing project feasibility, with actual project technical and operational parameters to be determined at the later stage of detailed engineering. With high dispatch priority, the proposed wind farm is proposed to cater to the existing base load demand, supplementing and offsetting diesel generation for this purpose. Peak load variations will continue to be provided for exclusively by on-demand diesel gensets and power imported from Iran. It has been established in the Baseline Load Demand Assessment study (HBP Report R3BL1WEP) that the base load demand in the regional grid is sufficient to absorb the 23.7 GWh proposed to be supplied to the system by the wind farm at Pasni.

Adjustment in Project Document:

Above explanation added to the section entitled Makran Power Market (under Regional Context for GEF Wind Project) in Section I of the ProDoc.

7. Comment:

It is not possible to compete with combined cycle thermal plant under current estimates of the proposed wind plant, and this could become an alternative if the Makran grid were to be connected to the national grid. Thus this option should be considered and/or commented upon.

Response:

Detailed discussion on prospects of connecting the Makran region to the national grid is included in Section 5.1 of the Baseline Load Demand Assessment study (HBP Report R3BL1WEP), as the first alternative power supply option considered. This option is widely considered technically and economically unviable in the foreseeable future, and is not mentioned in the current planning horizon of the Energy Wing (Planning and Development Division of the GoP) or WAPDA (e.g., in the National Power Plan). The recent cross-border import of power and proposed privatization of power networks has further reduced the financial attractiveness of major new investments in long distance

transmission lines to connect a low load region with a weak market profile with the national grid.

Adjustment in Project Document:

Already mentioned in the ProDoc in Para 4 under Makran Power Market (under Regional Context for GEF Wind Project) in Section I. Further explanation not considered necessary as this does not rank high as a possible option, but details provided in Section 5.1 of the Baseline Load Demand Assessment.

8. Comment:

Site selection. According to paragraphs 43 and 45 the site selection was based mainly upon the existing infrastructure for grid connection at Pasni. The more important issue of wind resources seem to have been less in the foreground/ Strongly suggested to continue the search for better wind sites as part of the Phase 1 activities

Response:

Initial location of the project at Pasni under PDF 'A' in 1998 made on basis of existing power infrastructure, local load demand, terrain and demographic considerations, and assumption of likely diurnal winds in coastal region (in the absence of more reliable wind mapping). However, as Part of PDF 'B', wind monitoring at several alternative sites was considered an important first element establishing viability of the proposed plant. Due to technical consideration, only one micro location at Pasni was considered potentially viable, where comprehensive wind data collection was initiated and continues at present. It is proposed in the ProDoc under Phase 1 to further expand the wind measurement and assessment of other potential sites further a field in the Makran region as part of IC Outcome 3 in collaboration with the ongoing detailed wind mapping being carried out by the Pakistan Meteorological Department (PMD), so that a final decision on optimal plant sitting can be made before proceeding with Phase 2, especially because the local transmission grid now connects additional locations from where power evacuation may be possible.

Adjustment in Project Document:

Selection rationale for initial wind monitoring and micrositing at Pasni is mentioned extensively in the project background reports and studies (including Site Selection report submitted by COWI). Collection and assessment of additional wind data and alternative site evaluation included in IC Outcome 3 in Incremental Cost Analysis in Section II of the ProDoc.

9. Comment:

Wind resource. It is not clear (because not mentioned in background report 2) if array losses, availability and electrical losses are included in the estimation of the capacity factor of the wind power plant. Unfortunately the report does not include the standard estimation of the Weibull shape parameters, which are important when assessing the resulting capacity factor

Response:

Wind speed frequency distributions are most commonly defined to 1 m/s intervals and this is certainly considered to be accurate enough for

purposes of the GH review. The energy review was undertaken by COWI and they provided no detailed information on how they considered factors such as array losses, availability and electrical losses. The Weibull parameters where not calculated since these were not considered as standard in the consultant analyses contract. Gerard Hassan Consultancy consider that the measurements provide the most accurate definition of the site wind speed frequency distribution rather than using a function which is derived from the measurements and may not best define the "real" trend

Adjustment in Project Document:

Not necessary at this point especially considering the fact that phase 2 will now also be re designed so as to consider an open support package option to promote a certain amount of commercial on grid wind MV to be built and operated in Pakistan. This comment will be considered as necessary for future possible wind resource comparisons so as to have best grounds for selecting the best sites.

10. Comment:

The long-term measurements from the nearby airport of Pasni should have been used to compare the 15 months observation period data fro the airport with its long-term average at the same station. This would have given more certainty about the relation of the measured values at Pasni to the long-term average wind speed at the Pasni site also.

Response:

Garrad Hassan Consultancy strongly disagrees with this point. If the correlation between a reference mast and site mast is poor this means you cannot compare the relative windiness at the two locations. A poor correlation could mean that while there are high winds at the reference mast there may be low winds at the site. But on another day they may both have high winds. For the long-term assessment of the wind regime at a site mast there must be a correlation with the reference mast. If the correlation is poor then including this in the analysis will actually increase the uncertainty in the long-term prediction, not decrease it.

Comparisons with overlapping data, beginning in January 2002, between the on-site, hub-height wind measurements and GH made the standard PMD aero met data from the Pasni airport and the correlation was found very weak, as mentioned in their report on Wind Measurements Undertaken at Pasni, Pakistan. The comparisons of concurrent records included daily and monthly mean wind speeds. Therefore, further use of historical long-term met data was not considered reliable for the requirements of the project.

Adjustment in Project Document:

Already mentioned in first paragraph of Wind Resource Assessment in Part 1a of Section I of the project document.

11. Comment:

Analysis of diurnal cycles is missing, both for the demand and for the wind power availability (see also comment 6 above as it refers to the same issue). It is strongly recommended to add this study as an integrated element of Phase 1 of the project

Response:

It is correct that there is no assessment of the diurnal variations in wind speeds. This can be worked out, but it will be too late for inclusion in the overall report. However it should be noted that the diurnal variations in the wind speed will only aid the profitability of the wind farm if you are going to be paid a different price for electricity at different times of the day, something that is not yet confirmed and/or certain to happen. However it could be included under the initial part of the project implementation as suggested by the reviewer although the costs should be considered if this is deemed necessary.

Under the wind resource assessment proposed in phase 1, daily profiles at the project site(s) will continue be generated and provided to the developer for incorporation into the detailed technical design of the wind farm and its integration with the local grid.

Adjustment in Project Document:

No adjustments deemed necessary at this point.

12. Comment:

If 60-80 MV were to be added to the local grid of Makran (see paragraph 91 in project document), then it would create an imbalance between production and demand that would make necessary connection with the national grid. If that is a feasible scenario, then wind energy cost must be compared with the cost of the other generating options within the national grid (e.g. the combined cycle option mentioned above in comment 7). Note that Clean Development Mechanism (CDM) contributions could be used to lower the effective cost of wind energy. Nevertheless, replicability would depend on finding sites with better wind resources, see also c). In this respect it would be important to have information about the PCRET study mentioned in paragraph 7, in which wind resource measurements are planned (and in execution?) at 40 different sites in the country. It is quite possible that higher wind velocities resulting from the diurnal land-sea wind cycle can be found a few kilometers more land-inwards from the coast, and not at the coast line where measurements have taken place (see background study 4)

Response:

An installed wind power capacity of 60 to 80 MW would constitute the long-term replication potential along the Balochistan coast, based on similar or better conditions (sites, winds, demand, economics, etc.) pertaining to other potential coastal sites. It is anticipated that such sites would be developed consequent to the demonstration wind project at Pasni, depending on its successful integration into the regional grid. Total generation requirements on the Makran grid would have increased substantially (see demand growth projection scenarios in the *Baseline Load Demand Assessment* study), allowing for more wind power capacity to be added to the local energy supply mix. More importantly, other potential wind IPPs in the rest of Pakistan are planned to be developed in parallel, and the overall replication potential in the country could be much higher, even if immediate constraints exist in the Makran region. For example, the Alternative Energy Development Board has defined a target of 1,700 MW of commercial RE in the country by 2015, and is in advanced planning for a 100 MW wind farm at Gharo in the adjoining Sindh province.

The overall national potential for grid-connected wind farms has so far not been properly assessed, although efforts are underway in this direction (including the PMD wind mapping exercise). Phase 1 of the full-scale project will help define this more clearly by gathering and assessing additional wind speed data for different locations in the country. Thus, on a countrywide basis, ~100 MW can safely be assumed as an achievable immediate (5-year) countrywide target independent of possible geographical grid integration or demand limitations specific to the Makran region.

Adjustment in Project Document:

Explanation added to Replicability under Program and Policy Conformity in Section II of the ProDoc.

13. Comment:

The wind resource as established in background report 4 does definitely not call for a Wind Class I certified turbine, but rather for a Class IV turbine. However Class IV turbines are not readily available on the market, and it is suggested to specify a class III turbine (up to 7.5 m/s annual average wind speed), unless a better site is identified. Such a turbine, designed for a low wind speed region, will have a larger rotor for the same installed power, and result in a higher capacity factor than a Class I turbine. Again it is not clear what turbine characteristics have been used (not mentioned) in the estimation of the capacity factor.

Response:

We agree that it would be relevant to look at various classes in connection with more detailed analysis of the project design of phase 2 of the project now to be more specifically considered within phase 1.

Adjustment in Project Document:

No adjustment required at this point.

14. Comment:

Additionally it is important to mention that the type of wind turbine to be selected should have the implementation within a hybrid wind-diesel grid in mind. Possibly, modern options with IGBT based 'back to back' converters could have a large advantage with respect to the need of reactive power, see also the requirements detailed in background study 3. This then would lead to a variable speed turbine. In order to optimize the efficiency of the total system, it is strongly suggested to look into the possibility of an integrated control for the diesel and wind units, as mentioned in chapter 3.8 of background study 3 although this requires expertise and experience.

Response:

This possibility has been raised in the project documentation, as referred to in the comment. Specific technical details have been left to be decided later between the project developer and the power purchaser as part of the IPP detailed engineering and contract negotiation process. The PDF 'B' study should not be construed as the final technical design document for the project, but rather as an indicative study outlining the broad economic and technical aspects of the demonstration wind farm with respect to other available power supply options.

Adjustment in Project Document:

None required. Integration with a diesel-based utility grid, and requirements thereof, have already been qualitatively mentioned.

15. Comment:

The wind farm layout considered in (among others) paragraph 44, should be further optimized with respect to predominant wind directions and wake interference. Two rows normal to the predominant South Westerly wind, would possible give less array losses; one single row (with larger turbines than those considered so far, say 1 or 1.5 MW) facing the South-West direction might be even more beneficial.

Response:

Point taken, and we suggest to look closer at various wind farm layouts as and if necessary for phase 2 when/if final site has been defined (taking into account specific site boundaries, soil conditions etc.).

Adjustment in Project Document:

Would be considered as needed for phase 2 of the project. No project document adjustment needed at this point.

16. Comment:

Some of the background studies, e.g. [2], are based on an assumed capacity factor of 0.3 instead of the value of 0.18 stated in the Prodoc. It should be checked if this large difference effects the conclusions of such studies in an important way.

Response:

A benchmark reference capacity factor of 0.25 to 0.3 has been taken as the international average for calculation of typical energy output from a hypothetical wind farm in the Baseline Load Demand Assessment study projections of the regional power demand and supply analysis. The energy requirement is independent of possible generation source, and the hypothetical wind farm has only been used for illustrative purposes to show that such a capacity could easily be absorbed by the local power system over the time period studied. A lower actual capacity factor would not negate this conclusion, but would only call for additional power supply from other sources to compensate for the reduced wind energy generated.

However, for project-specific studies, such as the Financial and Economic Evaluation (HBP Report R3FAWEP), the actual estimated capacity factor of 0.18 for the Pasni site has been used throughout.

Adjustment in Project Document:

None required.

17. Comment:

Summary Comments for this section:

In conclusion, to this reviewer's opinion, there are many aspects to consider before a firm decision should be taken about the implementation of the wind farm, the most important one being finding a site with a better wind resource. Apart from this, some actions

described above can be carried out already, with the existing wind data, and perhaps additional data from the PCRET studies referred to in paragraph 7.

It is suggested that sound answers to these questions must be available, before taking a possible 'go' decision at the end of Phase 1. If it were clear already at this time, that no better wind resources are available, the project should be seriously questioned. In fact, as stated before, large-scale wind energy development on the Makran grid will require the grid to be interconnected to the national grid, for which a better resource is economically necessary.

Response:

The conclusion is extremely valid, and has been addressed by defining parameters and criteria for transitioning from Phase 1 to Phase 2, keeping open the option of alternative sitting based on more complete and comprehensive wind and technical assessments to be undertaken in the early phase of the project.

Adjustment in Project Document:

As required and defined in response to individual comments above.

Regarding the Barriers and Constraints Presently Existing

18. Comment:

Regarding the institutional barriers (paragraph 30). Is the role of PCRET, more of technology and implementation? Note that the proposed institutional framework for RE in Pakistan in exhibit 3.2 of background report 6 does not mention AEDB. It is essential for the success of any program in renewable energies, that there be a central agency to coordinate activities, in order to prevent a lack of clarity regarding the agencies responsible for certain decisions. It is assumed that the AEDB will have an important role in the Activities 1, 2, 5 and 7 described in paragraph 137, although this agency is not mentioned there. It is recommended that full clarity be given to all stakeholders where the ultimate responsibility lies for key decisions.

Response:

The AEDB is a recently created body that did not exist during the entire PDF 'A' and 'B' study timeframe. However, given it's central role in the planning and implementation of future RE projects in Pakistan, it has been duly incorporated in the project's IC activities and institutional arrangements (including the Project Steering Committee). It is proposed that UNDP/GEF propose appointing AEDB and the PPIB as the joint National Executing Agency (NEA) for the project to provide the necessary political patronage and operational support necessary for attaining it's objectives.

Adjustment in Project Document:

AEDB has been included, along with PPIB, as the focal agency for IC Output 2 as well as in the achievement of project milestones in Project Implementation Arrangements in Section II of the ProDoc. Decision to include AEDB/PPIB as joint NEA in the ProDoc awaiting GoP approval.

19. Comment:

Another important barrier to be removed is the Technology and Information Barrier. The activities 3 and 4 of paragraph 137 should be utilized to the fullest extent to remove these barriers. The background documentation resulting from the phase B activities shows high quality knowledge to be available in general energy subjects, but still some need for improvement in special wind energy expertise. It is recommended that in the work plan to be set up a detailed knowledge and technology transfer plan be designed, with complete clearness on who has to be trained when and how and for what purpose. It is also recommended that government agencies, private industry and engineering faculties of universities be important participants in these activities. Such a education and training program should start at the very beginning of the project to be effective.

Response:

Detailed terms of reference for IC Outputs 3, 4, 5, & 7, to be developed by UNDP prior to project contracting, would include definition of technology transfer, training, and related capacity building in wind power assessment, planning, project development, and construction and operation.

Adjustment in Project Document:

None required. To be covered separately in the IC activity TORs.

Benefits, Relation to Goals of GEF, Regional Context and Replicability

20. Comment:

Regarding the values of reduction of GHG emissions it is observed again that the estimations are made on the assumption that all wind energy that can be produced, can be consumed and hence will be produced. It is emphasized that the consequence of this, for further wind energy development in the same region, is the connection of the regional grid to the national grid, to enable the exportation of the energy to more load centers.

Response:

Actual realizable wind power potential to be determined with some quantitative basis as part of Phase 1 activities, leading to better estimates of GHGs mitigated.

Adjustment in Project Document:

None required. The ProDoc gives very rough, conservative estimates for GHG mitigation due to potential wind power development in only the coastal belt. Actual national potential would be correspondingly higher, but cannot be determined with meaningful reliability given the incipient status of accurate wind mapping in Pakistan.

Sustainability of the Program

21. Comment:

Sustainability of the project and the wind energy program is addressed directly in paragraphs 99 to 101. The financial sustainability is discussed in paragraph 100. It is in this paragraph that the values of 14.0 to 8.8 US$c/kWh are mentioned. In the accompanying table (Exhibit 1) these values are shown to be respectively: the base cost (14.0) and the cost (8.8) resulting from a higher capacity factor, a lower interest rate, a

lower capital cost, a GEF donation of 3 million US$ and a payback period of 8 year instead of 7 year for the base case. According to this reviewer's opinion, the GEF grant is only a temporary incentive, although possibly partly replaceable by CDM schemes in the future. However, the only way to drastically increase the financial sustainability would be with a higher capacity factor, hence a better wind resource.

Response:

The PDF 'B' study was limited to the Pasni site, the only location for which quality wind data was collected. While the reviewer's comment about a higher capacity factor drastically improving the proposed wind farm's financial viability is entirely valid, present data does not allow for such an alternative to be deemed available. However, it has been proposed in Phase 1 to evaluate the wind resource at Pasni and other coastal locations better, so that the possibility of other alternative sites with higher capacity factors can be assessed. In addition, the wind power production costs quoted include the impact of a +2% capacity factor increase at Pasni, if further wind measurements substantiate can this.

Adjustment in Project Document:

None required. The comment is more along the lines of a self-evident statement, although its intention is valid: the project should explore ways of enhancing the wind farm's estimated capacity factor, either through relocation or possibly better wind analysis results based on a longer monitored time period. Initiatives to explore both possibilities further have been incorporated into the project, as discussed, and therefore no specific further changes to the ProDoc are deemed necessary on this account.

22. Comment:

Another issue that is very important for sustainability is an added local content that can only be achieved with a build-up of local knowledge and use of local technology. Hence the importance of a well-structured knowledge and technology transfer program.

Response:

Acknowledged and addressed in response to Comment 19 above.

Adjustment in Project Document:

23. Comment:

Paragraph 101 indicates the importance of the enabling environment, which must be a result of Phase 1 of the project, i.e. the first two years. This is indeed an absolutely necessary condition. Progress in this area should be made measurable before the start of the project and evaluated for the go no-go decision for the second Phase 2, see also paragraph 90. The monitoring and evaluation structures, described in paragraphs 108 to 110, are essential for the timely warning if established goals seem to be in danger of not being met.

Response:

Acknowledged.

Adjustment in Project Document:

The comment reiterates what is already stated in the ProDoc. No further changes considered necessary.

Linkages Programs and Plans in the Region

24. Comment:

Connection of Pakistan's national grid to the grid of neighboring countries can have stabilizing effects on the total. It is strongly recommended that grid stability studies for various alternatives be done as part of Activity 4 of paragraph 137.

Response:

Grid stabilization study would be part of the technical studies to be undertaken at time of project bidding and evaluation. It would entail additional expenses beyond those already budgeted for the project, so a final decision may be taken in this respect by GEF.

Adjustment in Project Document:

Pending response from UNDP/GEF.

25. Comment:

In a larger context, it should be noted that both China and India have quite some experience in wind energy implementation on utility scale and that these experiences could be helpful for Pakistan, if so desired. Developments in India are mentioned in some of the background documents.

Response:

International experience, including that from China and India, would be provided to the project through the international component of the TA activities. The project would also benefit from other similar GEF-supported wind power development efforts, particularly in Mexico, Kazakhstan, and Iran. Chinese wind turbine industry already has several local counterparts interested in participating in project development.

Adjustment in Project Document:

None required.

Degree of Involvement of Stakeholders in the Project

26. Comment:

The stakeholders are many, and described in many different paragraphs in the Prodoc. The database of foreign private sector interested parties in Appendix C of [7] needs urgent updating, since some of the companies mentioned there do no longer exist. This is the result (in part) of the dynamic wind energy scene, which makes frequent updating a necessity.

Response:

Database will be updated from time to time during the course of the project, as required. Original database was developed as part of the Identification of Policy Framework and Potential Sponsors (R3PF1WEP) in late 2002.

Adjustment in Project Document:

Not part of ProDoc, so no changes required.

Capacity Building Aspects

27. Comment:

Capacity building is central to Activity 4 of paragraph 137. It is reassuring to see that emphasis is made on capacity building within the private, industrial sector. Capacity building is also very important on the decision preparation level in the GoP agencies that will be involved. It is important to identify agencies, persons and training needs at a very early moment, possibly still before the start of the project, since a lot of the creation of the enabling environment will depend on government officials with sufficiently detailed knowledge.

Response:

Acknowledged and already addressed in response to Comment 19 as far as training requirements are concerned. Key focal agency targeted for capacity building have been specifically identified in the Incremental Cost Analysis section of Section II and the IC matrix in Annex A.

Adjustment in Project Document:

None required.

Annex C (3): GEF Secretariat Review and UNDP Response

January 2004 (Work program entry)

1. Country Ownership

GEF Secretariat:

Most of the risks and assumptions discussed in the log frame of this project proposal are related to attitudes, interests and cooperativeness of stakeholders, particularly from the public sector. Can these risks be mitigated and if yes how?

UNDP:

The existing project design has already incorporated some mitigation strategies towards mitigating these risks. A revision of the risks and assumptions was undertaken and several were removed and some new assumptions and risks added to have a more balanced view on risks that still need to be closely monitored during project implementation.

GEF Secretariat:

The co-financing from the Government is extremely low, particularly in cash. This is not a particularly strong sign of country driven ness.

UNDP:

Agreed. There are ongoing discussions with the Government of Pakistan and other international donors that could widen the co-financing, including cash contributions. These will be actively pursued and additional fund mobilization is expected for both project phases. For the GOP co-financing, meetings will be in held in Islamabad the next few months with high-level representatives (such as the Ministry of Science and Technology and the Alternate Energy Board to discuss and negotiate possible additional budget allocations towards the project based upon newly announced plans to promote renewable energy technologies in Pakistan). Another issue that may change the contributions quite radically with respect to phase 2 of this project will be the possible design of specific financial mechanisms to provide incentives to wind energy generation above the average tariff conditions currently being offered to new fossil IPP projects. This was the case in a recent project approved for Tunisia and something similar is among the options to be evaluated for phase 2 of this project.

2. Program designation and conformity

Project Design

GEF Secretariat:

The project proposes two phases: In Phase 1, a policy package for wind power investments will be negotiated with the government, containing, e.g. rules for a PPA, and import tariffs. In Phase 2, a wind farm of 15 MW shall be built in Pasni. The feasibility studies for this wind farm were part of the PDF-B.

The necessity of Phase 2 is not very clear. The STAP roster reviewer has doubted the quality of the location, the project brief itself doubts the robustness of the local grid, and the AEDB seems to plan a wind farm at a very different location. This means to me that the benefit from a demonstration project is limited and the site chosen might not be the best available. Why was this site chosen? Maybe the project could lose some of this geographic focus on this particular location, and "Phase 2" can be converted into a more unspecific support scheme that mitigates wind-specific project risks, but has open access for all wind-project developers.

UNDP:

We agree with this fundamental comment and we have already made changes throughout this executive summary and in the project document that incorporate the need for this redesign of phase 2 as a part of the activities of phase 1. In addition to this, we will be submitting phase 2 of the project separately together with an external evaluation that will confirm the soundness of the same and/or suggest changes that would be incorporated. As a consequence of this phasing of the project we have clearly indicated within the document what refers to phase 1 and also in some cases to the now only indicative phase 2 (to be modified during phase 1) descriptions.

GEF Secretariat:

The planned GEF contribution to Phase 2 is 2.5 m USD but the project brief does not specify whether this will be a subsidy to just one wind power project or several. In fact, it is left up to Phase 1 to define the "exact mix and design" of the "innovative financial and economic mechanisms" that are to be sponsored by GEF in Phase 2. If it is not possible at this stage to be clear on the characteristics of this support, it is proposed that Phase 2 comes before Council separately.

UNDP:

Agreed. Phase 2 of the project will be resubmitted separately to the GEF towards the end of phase 1 for approval.

GEF Secretariat:

In particular, the logic and replicability of the "demonstration of a business model" with a large but unsustained grant component is in doubt. Wouldn't it be more important to find sustainable incentive schemes that mitigate or balance the risks of wind power as compared with other IPP investments?

UNDP:

Agreed. This is currently considered within the activities under output 6 and it will be further developed within the detailed log frame and TOR before final CEO endorsement of the project document to ensure that appropriate best practices and available options are considered to come up with a suitable proposal for Pakistan that can be agreed upon by all key stakeholders and negotiated with the necessary financial commitments

GEF Secretariat:

Shouldn't this have been part of the PDF-B?

UNDP:

Yes, however the PDFB project for Pakistan wind was approved back in 1997 and because of several delays it is only now being presented for work program entry in early 2004. This means that the initial project design that was considered and thus the associated background studies did not cover all the currently required issues. As such some of them are now proposed to be covered within phase 1 of the project.

GEF Secretariat:

The current proposal has already met increased interest, including uninvited investment proposals. This might be an indication that it might not be necessary to be involved in the setup of the demonstration wind farm but that the GEF money for Phase 2 might be better used through a financial support scheme that is open to all IPPs, like for example in Tunisia. This is particularly advisable since concerns about the stability of the grid in the area of Pasni are raised in the project document, and concerns about the quality of the wind resource are raised by the STAP roster reviewer.

UNDP:

As indicated above we are in agreement with this fundamental observation and we are now phasing the project accordingly and making arrangements for separate submission to GEF as requested so as to fully incorporate this.

GEF Secretariat:

Have carbon finance streams been considered and if yes in what respect?

UNDP:

No. This will be one of the options to be studied in more detail during the analysis of possible financing and incentives support packages during phase 1 and it will possibly form part of the overall suggested support package to offer a sustainable environment for commercial on grid wind operations in Pakistan.

Sustainability (including financial sustainability)

GEF Secretariat:

If the project restricts itself to the demonstration site that is discussed here sustainability of the GEF intervention is less certain than with a more general focus on an enabling environment and possibly an incentive scheme.

UNDP:

Agreed, see above for more details.

Replicability:
GEF Secretariat:

The long-term replication potential is estimated at 60 – 80 MW along the Balochistan coast. In other locations in Pakistan, other wind IPPs are planned to be developed, and the overall replication potential is much higher.

UNDP:
Yes, the estimate of 60-80 MW was only based upon an initial evaluation of the base load demand assessment made during the PDFB phase and its implications for technically feasible on grid wind installations. However the effective replication potential will be revised as part of the phase 1 activities and it is expected that a nation wide estimate will emerge and also be substantiated because of the redesign of phase 2 of this project that will open up the possibilities for several alternative regions in Pakistan.

Stakeholder Involvement:
GEF Secretariat:

How about the local RET industry? Is there an industry association? Does the project envision creating one?

UNDP:

It is still in a very initial phase although components for other RET such as solar homes, domestic biogas and small wind systems have been produced locally. There are several industry associations in Pakistan but none specific to RET. Currently the project does not envision the creation of a specific RET industry association, however it is anticipated to build capacities of selected manufacturers and private sector stakeholders that can participate within this project and/or future RET developments, either linked to the manufacturing of components and/or linked to the investment and operation itself of the anticipated commercial wind energy plants. If sufficient basis is encountered it may be an option to create a specific RET industry association as a specific part of the project.

3. Financing

Co-financing:

GEF Secretariat:

Given that most of the money is raised in private investments into the wind farm, the co-financing ratio is rather low. In particular, the government's cash co-financing is too low.

UNDP:
Agreed. See response above (page 77 2nd comment) with regards to how we are working on this to improve the co-financing and thus further strengthen the GOP and other parties financial commitments within the project. Above we already mentioned how we are approaching the GOP co-financing challenge and in addition we can mention that there is an ongoing sub program within a larger national environment action plan support program (started in 2001), NEAP-S, which is working actively towards facilitating the mobilization of additional resources for renewable energy and energy conservation in Pakistan and they have an estimate for pledging around US$ 3,000,000 million for various RET. Emphasis on resource mobilization for this wind project has been strengthened within its mandate and it is expected that additional funds will be raised as leveraged funds towards both project phase 1 and 2. The managing unit for this sub program is ENERCON within the GOP and the overall NEAP-SP is representative of all the major donors and major GOP institutions. Depending on the time frame and success these additional funds may be included either as baseline, parallel funding, co-financing or finally as leveraged funding, depending on the progress of these announcements and the associated negotiations with regards to this project. Further clarifications will be sought before project document submission for CEO endorsement.

4. Institutional Coordination and Support

Consultation, Coordination, Collaboration between IAs, and IAs and EAs, if appropriate

GEF Secretariat:

Can lessons from other wind projects of GEF and UNDP/GEF, e.g. Tunisia and Mexico be transferred to here and help make the project more robust?

UNDP:

There is a continued dialogue within UNDP GEF on project design and implementation lessons learned. The Pakistan project can incorporate lessons from the Mexico project especially in terms of how to strengthen capacities among local and national level resource people and institutions on wind. It is also anticipated that extensive exchange will be made during phase 1 with the Tunisia project to incorporate possible best practices with regards to the financial and incentive schemes that they are suggesting to implement.

5. Response to Reviews

Review by expert from STAP Roster

GEF Secretariat:

The project team seems to await answers from their consultants for several of the STAP reviewer's questions. Most of them are of quite technical nature and can be answered during project appraisal. However, some questions should be addressed at this stage:

- ✓ the STAP roster reviewer raises the question for other sites in Pakistan, and mentions the PCRET program for wind resource mapping that seems to be duplicated by the proposed project.
- ✓ Please address capacity building for an enabling environment, i.e. for wind measurements and turbine construction, e.g. classes at local universities and engineering schools

UNDP:

- ✓ Technical responses from our consultants have now been received and updates have been provided in the relevant sections in the annex where UNDP responds to STAP review comments
- ✓ As mentioned above phase 1 will now specifically consider several sites and the project will be integrated into the overall nation wide effort of wind mapping such that overlapping is avoided and a useful database is developed that can benefit future wind energy developments in Pakistan
- ✓ Here we will integrate experiences from Mexico and other countries when finalizing the project document so as to guarantee proper capacity building efforts.

7. Budget Line items related to TOR (including schedule)
Summary Recommendations by Program Manager

GEF Secretariat:
Further clarification is required as to

- ✓ Why the financial support should be restricted to the Pasni site and how that influences the replication
- ✓ How transition to Phase 2 can be done in a cost-effective manner for the GEF; proposed from the side of the GEF sec: reentry of Phase 2 into the work program upon arrival at the milestones for the transition. The milestones are formulated such that they can hold up the project's progress for a long time.
- ✓ The clear emphasis of this project should be on enabling environments and power sector policies, not so much on the specific investment at Pasni.

UNDP:

- ✓ It was agreed during bilateral consultations and review, that the financial support scheme/s to be developed in detail during phase 1 would be open and allocations made on a competitive basis.
- ✓ We likewise agreed on the need for phase 2 to be resubmitted to the GEF upon arrival at critical milestones for this transition to take place (defined during phase 1, see page 33 for some indicative issues/areas to be covered). This will be further bolstered through an external evaluation that will assess these milestones, the extent of progress to reach them towards end of phase 1 of the project and form part for the justification for the resubmission to the GEF.
- ✓ Agreed. See above for clarifications.

December 2004 (Review of UNDP Project Document)

1. Clear Cut definition of indicators and triggers for phase 2:

A. GEF Secretariat: Suggest you include a very specific section that spells out the details of the procedure (i.e. the project brief for phase 2 will be included in a work program for approval by Council) and the conditions that are necessary for this to happen. These conditions should be taken from the log frame and should be clear benchmarks.

UNDP: Fully agreed, and amendments have been made on page 40 to spell out the procedure. On pages 41-42 the milestone and triggers have been developed.

B. GEF secretariat: Going into the milestones as currently proposed, I don't really understand the first one. Is the actual trigger the completion of the resources assessment (i.e. output 3 of the project), or the selection of bids for the Pasni site (which would not be in line with the discussions that we had at WP inclusion)? Actually, I wonder why the Pasni site still plays such a prominent role in the whole document. (See discussions in the Iran case)?

UNDP: The trigger has been reformulated to provide clarification. The actual trigger is the wider national level map together with specific sites assessments from different promising wind regions in Pakistan. The Pasni references have been either deleted or minimized, so as to provide the proper presentation of what we are indeed proposing to do here, as is per the agreements in the bilateral discussions.

C. GEF Secretariat: I agree with trigger 2, to the degree that the development of a "policy package" including a fiscal regime as a necessary step for phase 2. "Adoption" - as indicated in the title of the trigger- goes a little further than just having the NEA obtaining the package - I guess the Pakistani government or parliament have to actually put it into national regulations. The package also needs to comply to a couple of common sense criteria in order to be potentially effective, but the document does not specify any kind of quality demands in the
milestone.

UNDP: Agreed and adjustments made on pages 40-42 to reflect this.

D. GEF Secretariat: The third milestone - "official notification (of a wind power tariff regime)(...) by NEPRA" sounds like a good idea (depends on what NEPRA is, that is), but the "notification" has to entail that NEPRA (assuming it's the regulator) will follow up on it. Maybe wording can be found that makes this clearer.

UNDP: See clarifications on page 41.

Annex I

A. Terms of Reference for the Project Committees

Project Steering Committee (PSC): The PSC would be comprised of high-level government, private sector and NGO representatives to oversee and guide project execution. It will ensure that important milestones are met and commitments from the concerned agencies are made in a timely manner. The frequency of PSC meetings and the composition is detailed in the Management Section of the document. In summary the main functions of the PSC would be:

- project review, monitoring and co-ordination;
- co-ordination of government actions and provision of policy guidance;
- facilitating policy and legislative reform to support private investment for establishing wind farms in Pakistan;
- ensuring cooperation from different government agencies to facilitate smoother process of policy formulation, notification and adoption
- ensuring adherence to UNDP guidelines for the administration of project funds
- final selection of the wind farm sites

Executive Committee (EC): The EC working as a sub-committee of for project coordination on regular basis would comprise the representation from the Economic Affairs Division (EAD), UNDP, AEDB, and the GEF OFP. Manager/CTA will act as the secretary of the EC and the National Project Director will be the Chair. The EC will be responsible for:

- quarterly (at least) review the project progress, take decisions and assign responsibilities for the smooth functioning of the project;
- discuss policy level issues and recommend to the Project Steering Committee for addressing these issues at the desired or appropriate level;
- provide essential support to the Project Implementation Unit in taking forward the recommendation of the project;
- ensure that the milestones of the project are met on time and delay on part of any institution is not hampering the project progress;
- ensure that UNDP policy for the implementation of the project in terms of mobilizing of inputs (staff, sub-contracts, procurements, trainings) are followed

B. Terms of Reference for the National Project Director and the Project Manager/Chief Technical Adviser

National Project Director (NPD): Alternate Energy Development Board (AEDB) would designate one of its senior official (at least at or above the level of Joint Secretary) to act as the National Project Director of the project. The key responsibilities of the NPD would be:

- to act as the focal point and responsible party for the project in the Government executing agency;
- to ensure that all Government inputs committed to the project are available to the project;
- to undertake for the selection and recruitment of the Project Manager/CTA and rest of the project team in line with UNDP procedures;
- to ensure that the Project Manager/CTA is empowered to implement the project;
- to support the Project Manager/CTA, as necessary, to resolve implementation problems;
- to select candidates for project experts and consultant positions in consultation with UNDP and EAD;
- to supervise the work of the Project Manager/CTA;
- to approve payments of project funds according to the procedures in the Project Cycle Operation Manual;
- to represent the project at meetings of the parties to the project agreement;
- to provide assistance in the coordination of project activities that involve other agencies of Government.

Project Manager (PM)/Chief Technical Advisor (CTA): The services of the PM/CTA will be required for the entire implementation period of the project. PM/CTA will work closely with UNDP, government counterparts and key stakeholders in order to facilitate project implementation towards the desired goals and objectives PM/CTA will be also responsible for general and financial administration, progress reporting, monitoring and the quality control of input from consultants and subcontractors providing assistance to the project. He/She would also serve as a senior adviser to the Alternate Energy Development Board – executing agency - on technical matters related to the project.

Reporting to the National Project Director (NPD), the PM/ CTA will be responsible for the following specific tasks:

advise the executing agency in establishing of Project Coordination and Implementation Structure;

- finalise the detailed action plan for each of the output of Phase I of the project;
- support in developing linkages among various outputs and provide substantive knowledge for promoting wind/renewable energy in Pakistan;
- analyze the baseline assessments to feed into the policy framework and creation of enabling environment for the promotion of wind energy technologies;

- steer the stakeholders consultation process to involve and learn from all the key stakeholders and identify linkages of on-going activities;
- identify institutional needs and provide support from the project resources to meet the targets under each of the outputs;
- prepare work plans that account for the monitoring activities by various partners and also identify the evaluation requirements;
- prepare TORs for the sub-contracts and procurements for the approval of the EC or PSC;
- advise the NPD on procedures to be followed in the mobilisation of inputs;
- in general, operational management of the production of project outputs according to the project document and the procedures in Project Cycle Operations Manual;
- act as the Secretary of the Project Steering Committee and Executive Committee, organize consultative workshops, trainings etc;
- timely preparation and submission of the Annual Project Report (APR)/Project Implementation Report (PIR) and any other required progress reports.

Qualifications: Advanced degree in environment related disciplines, with 7 to 10 years of experience in the area of Environmental Management and Renewable Energy and working on issues related to global environmental conventions. He/She must have strong cross-cultural communication, management and leadership skills and experience, problem-solving skills and results orientation and sensitivity to gender issues. Strong English language skills are also required.

Indicative AWP