



**SIGNATURE PAGE**

Country: Islamic Republic of Pakistan

UNDAF Outcome(s)/Indicator(s): Improved living conditions through environmental Management for sustainable development

Expected Outcome(s)/Indicator (s): A comprehensive approach integrating environmentally sustainable development and global environmental concerns and commitments in national development planning with emphasis on poverty reduction and quality gender analysis

Expected Output(s)/Indicator(s): Commitments under global conventions on biodiversity, climate change and land degradation being implemented, with adequate attention to gender issues.

Implementing Partner (Designated institution/Executing agency): Alternative Energy Development Board

Other Partners: Aga Khan Rural Support Programme, Relevant government departments, Line agencies, Local NGOs and local committees.

PIMS# 3467

Programme Period: Country Programme Action Plan 2004 - 2010  
 Programme Component: Environment  
 Project Title: Productive Use of Renewable Energy (PURE)  
 Project ID: 3467

Total budget:	USD 19,231,000
Allocated resources:	
• GEF	950,000
• UNDP	325,000
• Co-financing (Cash & In-Kind)	17,956,000*
* co-financing is parallel to UNDP and GEF funding	

Agreed by Economic Affairs Division (EAD):

Signature

Name and Title

**FARRAKH QAYYUM**  
 Secretary  
 Economic Affairs Division  
 Government of Pakistan  
 Islamabad

Agreed by Alternative Energy Development Board (AEDB):

**Arif Alauddin**  
 Chief Executive Officer  
 Alternative Energy Development Board  
 Ministry of Water and Power  
 Government of Pakistan

Agreed by UNDP:

Mikiko Tanaka



SIGNATURE PAGE

Country: Islamic Republic of Pakistan

UNDAF Outcome(s)/Indicator(s): Improved living conditions through environmental Management for sustainable development

Expected Outcome(s)/Indicator (s): A comprehensive approach integrating environmentally sustainable development and global environmental concerns and commitments in national development planning with emphasis on poverty reduction and quality gender analysis

Expected Output(s)/Indicator(s): Commitments under global conventions on biodiversity, climate change and land degradation being implemented, with adequate attention to gender issues.

Implementing Partner (Designated institution/Executing agency): Alternative Energy Development Board

Other Partners: Aga Khan Rural Support Programme, Relevant government departments, Line agencies, Local NGOs and local committees.

PIMS# 3467

Programme Period: Country Programme Action Plan 2004 - 2010  
 Programme Component: Environment  
 Project Title: Productive Use of Renewable Energy (PURE)  
 Project ID: 3467

Total budget:	USD 19,231,000
Allocated resources:	
• GEF	950,000
• UNDP	325,000
• Co-financing (Cash & In-Kind)	17,956,000*
* co-financing is parallel to UNDP and GEF funding	

Agreed by Economic Affairs Division (EAD):

Agreed by Alternative Energy Development Board (AEDB):

Agreed by UNDP:

Signature

Name and Title

**FARRAKH QAYYUM**  
 Secretary  
 Economic Affairs Division  
 Government of Pakistan  
 Islamabad

**Arif Alauddin**  
 Chief Executive Officer  
 Alternative Energy Development Board  
 Ministry of Water and Power  
 Government of Pakistan

Mikiko Tanaka



UNDP Project Document

**UNDP-GEF Medium-Size Project (MSP)**

Government of Pakistan

United Nations Development Programme

Line Agencies

Executing Agency- Alternative Energy Development Board (AEDB)  
Partners-GoNorthern Areas/ GoNWFP/AKRSP/ local Communities

**UNDP PIMS ID: 3467**

**Productive Use of Renewable Energy (PURE)**

Brief Description

This project aims at removing barriers to the adoption of renewable energy technologies (RETs) by promoting productive uses of energy in one of Pakistan's remotest areas: the Northern Areas and district of Chitral NWFP. The goal is to reduce greenhouse gas emissions by replacing and avoiding the use of diesel engines for productive uses, kerosene for heating and diesel-based village mini-grids, directly leading to the reduction of 461,465 tCO<sub>2</sub>eq in the first seven year crediting period from 2008-2014 and some 1,890,868 tCO<sub>2</sub>eq over 22 years. This will be achieved through the construction of 103 mini/micro hydropower plants (MHP). PURE responds to Pakistan's rural development priorities by promoting income-generating agricultural and agro-processing practices, rational use of natural resources and poverty alleviation. The project will focus on strengthening the capacity for MHP planning and management, including watershed management; and the promotion of a sound legal, institutional and regulatory framework to ensure the sustainability of project investments. With a four year duration, experiences gained and lessons learned would be shared for possible replication in other similar areas in Asia to help address such issues in the larger Asia region.

## ACRONYMS

ADB	Asian Development Bank
AEDB	Alternative Energy Development Board
AKDN	Aga Khan Development Network
AKRSP	Aga Khan Rural Support Programme
CADP	Chitral Area Development Project
GEF	Global Environment Facility
GHG	Greenhouse Gas
GW	Gigawatt (= 1,000 million Watt)
HH	Household
KESC	Karachi Electric Supply Corporation
kW	Kilowatt (= 1000 Watt)
kWh	Kilowatt-hour
LPG	Liquefied Petroleum Gas
MACP	Mountain Areas Conservancy Project
MFI	Micro-Finance Institution
MW	megawatt (= 1 million Watt)
MHP	mini/micro hydropower
MWh	megawatt-hour (= 1000 kWh)
NAC	Northern Areas, and Chitral
NWFP	North-Western Frontier Province
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
PCAT	Pakistan Council of Appropriate Technology
PCRET	Pakistan Centre for Renewable Energy Technologies
PMU	Project Management Unit
PPAF	Pakistan Poverty Alleviation Fund
PUE	Productive Use of Energy
PURE	Productive Use of Renewable Energy
PV	Photovoltaic
RE	Renewable Energy
RET	Renewable Energy Technology
SHYDO	Sarhad Hydel Development Organization
SMEDA	Small and Medium Enterprise Development Authority
SRSP	Sarhad Rural Support Programme
UNDP	United Nations Development Programme
UNFCCC	UN Framework Convention on Climate Change
VO	Village Organization
WAPDA	Water and Power Development Authority
WO	Women's Organization

**Table of Contents**

SECTION I: ELABORATION OF THE NARRATIVE  
PART I: SITUATION ANALYSIS.....2  
PART II : STRATEGY.....3  
PART III : MANAGEMENT ARRANGEMENTS.....3  
PART IV : MONITORING FRAMEWORK AND EVALUATION.....4  
PART V: LEGAL CONTEXT.....5  
SECTION II: STRATEGIC RESULTS FRAMEWORK, SRF AND GEF INCREMENT.....6  
SECTION III : TOTAL BUDGET AND WORKPLAN.....7  
SECTION IV: ADDITIONAL INFORMATION.....11

## SECTION I: Elaboration of the Narrative

---

### I. SITUATION ANALYSIS

According to a recent Pakistan Hydropower Potential Report of the Private Power and Infrastructure Board (PPIB), there exists a total hydropower potential of 41,722 megawatts (MW) additional power generation. Out of this, as many as 570 schemes and sites, with a potential of cumulative capacity of above 2,165 MW have already been identified for setting up small-size hydropower stations. The Northern Areas are the richest in hydropower followed by North West Frontier Province (NWFP). In the Chitral region of the NWFP, total hydropower generation capacity is technically proven to be over 1,368 MW, out of which small-size power projects account for 225 MW.

The Pakistan Power Policy 2002 categorizes projects up to 50 MW as “small-scale hydropower”<sup>1</sup> and their development is within the purview of the provincial and AJK (*Azad Jammu Kashmir*) governments. At present a number of small-scale hydro power plants are operating in the country, predominantly by public sector bodies, with a total installed capacity of approximately 242 MW. About one hundred mini- and micro- power (MHP) stations, with a total installed capacity of over 93 MW, are in operation in remote localities of the Northern Areas, mainly to provide electricity for lighting purposes, developed and operated by the Northern Areas Public Works Department (NAPWD). Similarly, Sarhad Hydro Development Organization (SHYDO) has developed 11 MHP stations in the NWFP with a total capacity of over 5 MW.

The involvement of the private sector is required to develop small hydropower projects. In this respect, SHYDO has taken a bold initiative to bring in private investment, and, besides handing over various mini- and micro- power stations in operation to the private sector, a number of potential sites are also being leased out. The power policy of the governments of the NWFP provides simple procedures, fiscal and financial concessions and attractive tariffs, aiming at inviting private sector investment basically for captive power for industry. A number of other public sector organizations and NGOs have also been involved in promoting the installation of MHP in the NWFP, namely the Pakistan Council for Renewable Energy Technologies (PCRET), Aga Khan Rural Support Programme (AKRSP) and Chitral Area Development Project (CADP).

The Alternative Energy Development Board (AEDB) was created in 2003 with the mission to introduce alternative / renewable energy at an accelerated rate so as to achieve atleast 5% share of renewable energy in the energy sector by the year 2030. The Board is also to play a pivotal role in establishing international linkages and engaging in the transfer of the state of the art know how on renewable energy technologies to local research institutions and industries in Pakistan.

PURE responds to Pakistan’s rural development priorities by promoting income-generating agricultural and agro-processing practices, rational use of natural resources and poverty alleviation. The project will build on a concerted effort among public, private as well as NGOs, and local partners to reach the above goals. Furthermore, the combined cash and in-kind contributions of the national government and AEDB, local government, NGOs, private sector, and end users are a very clear expression of interest for a project that is a combination of public-private investments.

---

<sup>1</sup> Though there is no internationally recognised definition, “small-scale hydropower” units are generally categorised as micro (less than 100 kW capacity), ‘mini’ (100 kW to 1 MW) and ‘small’ (above 1MW and up to 5 MW). In this report we use the acronym MHP for ‘mini- and micro hydropower’

## II. STRATEGY

This project aims at removing barriers to the adoption of renewable energy technologies (RETs) by promoting productive uses of energy in one of Pakistan's remotest areas: the Northern Areas and district of Chitral NWFP. The project will create new local jobs and sources of income while directly contributing to the reduction of 461,465 tCO<sub>2</sub>eq over first seven years and some 1,890,868 tCO<sub>2</sub>eq over 22 years. This will be achieved through the construction of 103 mini/micro hydropower plants (MHP). AEDB and AKRSP have signed a MoU to promote and develop hydro power in the Northern Areas and Chitral (NAC).

GEF involvement will be critical to ensure the sustainability of project investments. GEF support will play a vital role in strengthening local capacity to manage and operate MHPs, creating sustainable business models for MHPs notably by setting an appropriate tariff structure that covers O&M expenses, training community members to run cottage industries and other productive uses, helping to set up a local entity at the district level to promote and manage off-grid electricity options, and developing and proposing regulatory and policy instruments to promote decentralized energy options. Together, these measures will help to create an enabling environment that will ensure that investments in micro-hydropower in northern Pakistan are sustained over the medium and long-term.

The sustainability of the productive uses will be enhanced through natural resource management approaches, where projects are developed, by providing the necessary technical and institutional support for implementation at the district and the community level, and by supporting a national and local multi-stakeholder dialogue for long-term collaboration. The total required budget for construction of 103 MHP projects in NAC, which is complementary to ongoing efforts of the Government of Pakistan on rural electrification and sustainable rural development, is USD 19.231 million, and with USD 1.0 million solicited from the GEF to cover the productive uses for this project once completed and the capacity building of the implementing / executing organisations and the beneficiary communities.

Project outcomes are fourfold and will focus on 1) the development of 103 off-grid MHP projects, which generate at least 15 MW of renewable energy, 2) the identification and development of productive uses of renewable energy that will directly and indirectly benefit poor rural dwellers through employment generation and added purchasing power, 3) strengthened capacity for MHP planning, including watershed management; and 4) the promotion of a sound legal, institutional and regulatory framework to ensure the sustainability of project investments.

Mini/micro hydropower (MHP) is definitely the least-cost option when compared with other energy options in the NAC area, as it is most suited to the size and scale of investments that can be promoted for supplying energy services to these isolated areas. MHP stations will operate on a full cost-recovery basis after 4-6 years with payback periods between 11-14 years and internal rates of return between 7-15% over their economic life of 25 years. Financing of off-grid MHP investment will come mainly from the Federal Government, PPAF, private sector, commercial sector and through community investors.

The socio-economic benefits of the project have been estimated to be at least USD 5,082,500. These stem from the MHP stations themselves (revenues), improved productivity in local small industries and enterprise development, agriculture (irrigation) and animal husbandry (wool carding and spinning), local processing of agricultural products (fruits, vegetables, maize, wheat), increased productivity in crafts and skilled trades (carpentry, tailors, saw mills, repair shops) as well as small shops (washing and laundry, restaurants, guesthouses). The project will also generate total additional income of at least USD 6,420,000 for households. Furthermore, the project will create more than 20,000 seasonal jobs and 206 operators will get permanent jobs at these MHPs benefiting more than 18,000 households.

---

### III. MANAGEMENT ARRANGEMENTS

The project will be implemented by the Alternative Energy Development Board (AEDB). A *Project Steering Committee* (PSC) will be established with the representation of AEDB, Ministry of Environment, Ministry of Water and Power, Economic Affairs Division, Aga Khan Rural Support Programme, and UNDP. AEDB will chair the PSC and additional members will be brought in on a need basis by the PSC. AEDB will assign outputs related to the actual implementation of micro/mini-hydro to Aga Khan Rural Support Programme (AKRSP). These outputs would be jointly decided by AEDB, UNDP, EAD, and AKRSP after the signing of the Project Document and presented to PSC during the inception phase of the project. Broadly, AKRSP will be responsible for the planning, design, and construction supervision of 103 MHPs (and other renewable energy technologies) at 103 sites, assessment of potential productive uses and its implementation, involvement of village and women organisations in local management, and business services (information, training, marketing support). AEDB/AKRSP will be responsible for monitoring and evaluation activities, in cooperation with authorities, donors, NGOs and service providers.

The PSC will provide guidance and supervision on the PURE project implementation. Essentially, all participating entities in project co-financing and implementation will be invited to participate in its regular monthly meetings, convened by the National Project Director, based in AEDB, to oversee the smooth running and effective execution of programmatic activities and budgets and to allow for strategic planning, adaptive management and logistical coordination to take place. In this context, the project will also coordinate closely with other donor projects operating in the region that work in the area of renewable energy, natural resources management and/or livelihood improvement.

The National Project Manager will be responsible for formulating and submitting work and financial plans to the PSC, monitoring of work progress, coordinating with the various national and local government ministries and agencies and other project cooperation partners, ensuring the timely provision of inputs to the PSC, providing guidance to the project team of national and international consultants, coordinating issues with UNDP and AEDB, and reviewing reports and to look after administrative arrangements required under UNDP procedures.

---

### IV. MONITORING FRAMEWORK AND EVALUATION

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. The Logical Framework Matrix on [page 27] provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation system will be built. For more detailed information on PURE's project M&E system, please see [page 37].

In accordance with the programming policies and procedures outlined in the UNDP User Guide, the project will be monitored through the following:

---

### V. LEGAL CONTEXT

The legal context for UNDP-assisted programme and projects in Pakistan is established by two major agreements: 1) the Convention on the Privileges and Immunities of the United Nations, given effect by Act 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 Program concerning assistance under the Special Fund Sector of the United Nations Development Program, signed by the parties on February 25, 1960.



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.

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.

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 re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

The Executing Agency will provide the Resident Representative based in Islamabad, Pakistan with certified periodic financial statements, and with an annual audit of the financial statements relating to status of UNDP (including GEF) funds according to the established procedures set out in the UNDP User Guide.

## **SECTION II: STRATEGIC RESULTS FRAMEWORK, SRF AND GEF INCREMENT**

For SRF/ Project Framework (Ref Section IV Part 1 Approved MSP Section 3-B)

**SECTION III: TOTAL BUDGET AND WORKPLAN:**

Award ID:		Award Title:		Business Unit:		Project Title:		Implementing Partner (Executing Agency)		
		PIMS 3467 Pakistan Productive Use of Renewable Energy in Chitral District, Pakistan (PURE-Chitral)		PAK 10		PIMS 3467 Pakistan Productive Use of Renewable Energy in Chitral District, Pakistan (PURE-Chitral)		Alternative Energy Development Board (AEDB)		
GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Total (USD)
OUTCOME 1: Development of MHP schemes	AEDB	62000	GEF	71200	International Consultants	5,000	0	0	0	5,000
			GEF	71300	Local Consultants	10,000	10,000	10,000	10,000	40,000
			GEF	72100	Contractual Service Companies (demonstration of productive use of projects)	75,000	75,000	75,000	75,000	300,000
		04000	UNDP			25,000	25,000	25,000	25,000	100,000
			GEF	74100	Professional Services	25,000	25,000	25,000	25,000	100,000
		04000	UNDP							0
			GEF	74500	Misc					0
				Total Outcome 1	GEF	90,000	85,000	85,000	85,000	345,000
					UNDP	50,000	50,000	50,000	50,000	200,000
				Total outcome 1		140,000	135,000	135,000	135,000	545,000

OUTCOME 2: Development of Productive Use of Energy Model	AEDB	62000	GEF	71200	International Consultants	5,000	0	0	0	0	5,000
			GEF	71300	Local Consultants	10,000	10,000	10,000	10,000	10,000	40,000
			GEF	72100	Contractual Service Companies (demonstration projects)	45,000	45,000	45,000	45,000	44,000	179,000
		04000	UNDP		Public Consultations	10,000	10,000	5,000	5,000	5,000	30,000
		04000	UNDP	74500							
		04000	GEF	72300	Materials & Goods						
			UNDP								
			GEF	74500	Misc						
			GEF	Total		60,000	55,000	55,000	54,000	54,000	224,000
		04000	UNDP	Outcome 2		10,000	10,000	5,000	5,000	5,000	30,000
					Total Outcome 2	70,000	65,000	60,000	59,000	59,000	254,000
OUTCOME 3: Capacity Strengthening	AEDB	62000	GEF	71200	International Consultants	0	0	0	0	0	0
		62000	GEF	71300	Local Consultants	0					
		62000	GEF	74200	Audio Visual & print Prod costs						
		62000	GEF	74100	Professional Services						
		04000	UNDP								
			GEF	72100	Sub- Contracts	50,000	25,000	10,000	10,000	10,000	95,000
		62000	GEF	74500	Misc						
		62000	GEF	Total		50,000	25,000	10,000	10,000	10,000	95,000
		04000	UNDP	Outcome 3		0	0	0	0	0	0
					Total Outcome 3	50,000	25,000	10,000	10,000	10,000	95,000
OUTCOME 4: Establishment of Replication Models	AEDB	62000	GEF	71200	International Consultants	0	0	5,000	5,000	0	5,000

	62000	GEF	71300	Local Consultants	0	10,000	10,000	10,000	5,000	25,000
	62000	GEF	72100	Contractual Companies	10,000	10,000	10,000	10,000	10,000	40,000
	04000	UNDP								
	62000	GEF	74100	Professional Services	10,000	10,000	10,000	10,000	10,000	40,000
	04000	UNDP								
	62000	GEF	Total Outcome 4	GEF	20,000	30,000	35,000	25,000	25,000	110,000
	04000	UNDP		UNDP	0	0	0	0	0	0
				Total Outcome 4	20,000	30,000	35,000	25,000	25,000	110,000
<b>OUTCOME 5: MONITORING, LEARNING, FEEDBACK</b>	62000	GEF	71200	International Consultants	5,000	0	0	0	0	5,000
			71300	Local Consultants	10,000	10,000	10,000	10,000	10,000	40,000
			71600	Travel	9,500	9,500	8,500	8,500	8,500	36,000
				Total Outcome 5	20,000	19,500	18,500	18,500	18,500	81,000
<b>PROJECT MANAGEMENT UNIT</b>	62000	AEDB	71200	International Consultants	0	0	0	0	0	0
	62000	GEF	71300	Local Consultants	13,000	13,000	13,000	13,000	13,000	52,000
	04000	UNDP			0	15,000	15,000	15,000	15,000	45,000
	62000	GEF	71600	Travel	4,658	5,287	6,321	2,734	2,734	19,000
	62000	GEF		Communication	1,596	1,445	1,358	2,601	2,601	7,000
	04000	UNDP			0	2,000	2,000	2,000	2,000	6,000
	62000	GEF	72200	Equipment & Furniture	3,750	0	7,500	3,750	3,750	15,000
	04000	UNDP			24,000	20,000	0	0	0	44,000
	62000	GEF	74500	Misc	0	500	1,000	500	500	2,000
	62000		Total PMU	GEF	23,004	20,232	29,179	22,585	22,585	95,000
	04000	AEDB		UNDP	24,000	37,000	17,000	17,000	17,000	95,000
				Total PMU	47,004	57,232	46,179	39,585	39,585	190,000
				Total UNDP	84,000	97,000	72,000	72,000	72,000	325,000
				Total GEF	263,004	234,732	232,679	215,085	215,085	950,000
				Grand Total	347,004	331,732	304,679	287,085	287,085	1,275,000

• In financing section table a) and b), a cost for this component is shown under "Project Management Costs".

**Budget Notes:**

The total M&E budget is USD 106,000. A detailed M&E Plan is presented in the M&E section. The PMU carries out many of the monitoring functions as part of their TOR. Costs for those functions are part of the PMU salaries which appear in the budget under "Project Management Unit."

The GEF policy requires to specify all the associated funding coming from various sources. The recent committed funds from various sources are given in the table. This co-financing includes contributions from PPAF, PCRET, private/commercial sector, community investments.

Summary of Funds:									
GEF*	Cash	198,696	242,704	273,222	235,378	950,000			
UNDP	Cash	54,000	96,000	96,000	79,000	325,000			
PPAF	Cash/In-kind	3,00,000	1,000,000	1,000,000	1,000,000	6,000,000			
PCRET	Cash/In-kind	1,665,000	555,000	555,000	555,000	3,330,000			
Private Sector	Cash/In-kind	1,072,500	357,500	357,500	357,500	2,145,000			
Commercial Sector	Cash/In-kind	1,637,500	545,832	545,834	545,834	3,275,000			
Community investment	Cash/In-kind	1,603,000	534,334	534,334	534,332	3,206,000			
<b>Total</b>		<b>6,230,696</b>	<b>3,331,370</b>	<b>3,361,890</b>	<b>3,307,044</b>	<b>19,231,000</b>			
* This does not include PDF-A phase of USD 50,000									
<b>Total GEF</b>		198,696	242,704	273,222	235,378	950,000			
<b>Total Co-Financing</b>		6,032,000	3,088,666	3,088,668	3,071,666	18,281,000			



**GEF**

**MEDIUM-SIZED PROJECT PROPOSAL  
REQUEST FOR FUNDING UNDER THE GEF Trust Fund**

**GEFSEC PROJECT ID: 2747**

**IA/ExA PROJECT ID: 3467**

**COUNTRY: Pakistan**

**PROJECT TITLE: Productive Uses of Renewable Energy in Chitral District, Pakistan (PURE-Chitral)**

**GEF IA/ExA: UNDP OTHER PROJECT EXECUTING AGENCY(IES): Alternative Energy Development Board (AEDB)**

**DURATION: 4 years**

**GEF FOCAL AREA: Climate Change**

**GEF STRATEGIC OBJECTIVES: To promote the supply of and demand for electricity from renewable sources**

**GEF OPERATIONAL PROGRAM: OP-6**

**IA/ExA FEE: USD 100,000**

**CONTRIBUTION TO KEY INDICATORS IDENTIFIED IN THE FOCAL AREA STRATEGIES: As a direct impact of the project, 461,465 tCO<sub>2</sub>eq tons of CO<sub>2</sub> emissions will be avoided over 7 years. The indirect emission reduction impact of this project is estimated at 1,890,868 tCO<sub>2</sub>eq over a 22-year period.**

FINANCING PLAN (\$)		
	PPG	Project*
GEF Total	50,000	950,000
<b>Co-financing</b>	provide details in Section b: Co-financing)	
UNDP		325,000
Co-financing		17,956,000
Total	50,000	19,231,000
Financing for Associated Activities If Any:		

\*If project is multi-focal, indicate agreed split between focal area allocations

MILESTONES	DATES
MSP EFFECTIVENESS	May 2008
MSP	START Jan 2009
MSP CLOSING	Aug 2012
TE/PC REPORT*	Aug 2012

\*Terminal Evaluation/Project Completion Report

Approved on behalf of the UNDP. This proposal has been prepared in accordance with GEF policies and procedures and meets the standards of the Review Criteria for GEF Medium-sized Projects.

<p>Yannick Glemarec UNDP-GEF Executive Coordinator Date: 28 June 2007</p>
---

<p>Project Contact Person Martin Krause Regional Technical Advisor Climate Change Date: 28 June 2007 Tel. :+6622882722; Email: martin.krause@undp.org</p>
---

## **PART I - PROJECT SUMMARY**

### **PROJECT RATIONALE, OBJECTIVES, OUTCOMES/OUTPUTS, AND ACTIVITIES**

This project aims at removing barriers to the adoption of renewable energy technologies (RETs) by promoting productive uses of energy in one of Pakistan remotest areas: the District of Chitral. The project will create new local jobs and sources of income while directly mitigating some 461,465 tCO<sub>2</sub>eq over 7 years and indirectly some 1,890,868 tCO<sub>2</sub>eq over 22 years. This will be achieved through the promotion of mini/micro hydropower (MHP) that is linked to income generation and productivity enhancement that adds value to local production and resources. The sustainability of the productive uses will be enhanced through natural resource management approaches where projects are developed, by providing the necessary technical and institutional support for implementation at the district and the community level, and by supporting a national and local multi-stakeholder dialogue for long-term collaboration. The total required budget for this venture, which is complementary to ongoing efforts of the Government of Pakistan on rural electrification and sustainable rural development, is estimated at USD 19.230 million with USD 1.0 million solicited from the GEF to cover incremental costs. Project outcomes are fourfold and will focus on 1) the development of off-grid MHP projects, which generate at least 15 MW of renewable energy, 2) the identification and development of productive uses of renewable energy that will directly and indirectly benefit poor rural dwellers through employment generation and added purchasing power, 3) strengthened capacity for MHP planning, including watershed management; and 4) the promotion of a sound legal, institutional and regulatory framework to ensure the sustainability of project investments.

### **KEY INDICATORS, ASSUMPTIONS, AND RISKS**

Key indicators are:

- Identified barriers to renewable energy for productive uses in Chitral area are removed
- Implementation cost for MHP are reduced.
- At least 461,465 tonnes of carbon dioxide will be avoided by the development of at least 15 MW of MHP generation, linked with productive applications.
- With the project replication strategy implemented at least 1,890,868 tCO<sub>2</sub>eq will be avoided.
- Integrating reliable MHP as part of the local sustainable economic development is recognized as a key factor for success.

Key assumptions are:

- Political stability allows for investment in rural areas.
- There is strong local government support to develop the MHP projects as well as strong involvement of the community and a sense of ownership and of income-generation opportunity.
- The investments in 103 MHPs will go ahead as planned.

## COUNTRY OWNERSHIP

### A. COUNTRY ELIGIBILITY

Pakistan is eligible for GEF financing and has ratified the UNFCCC in June, 1994.

### B. COUNTRY DRIVEN-NESS

According to a recent Pakistan Hydropower Potential Report of the Private Power and Infrastructure Board (PPIB), there exists a total hydropower potential of 41,722 megawatts (MW) additional power generation. Out of this, as many as 570 schemes and sites, with a potential of cumulative capacity of above 2,165 MW have already been identified for setting up small-size hydropower stations. The Northern Areas are the richest in hydropower as reflected in the above table, followed by North West Frontier Province (NWFP). In the Chitral region of the NWFP, total hydropower generation capacity is technically proven to be over 1,368 MW, out of which small-size power projects account for 225 MW.

The Pakistan Power Policy 2002 categorizes projects up to 50 MW as "small-scale hydropower"<sup>2</sup> and their development is within the purview of the provincial and AJK (*Azad Jammu Kashmir*) governments. At present a number of small-scale hydro power plants are operating in the country, predominantly by public sector bodies, with a total installed capacity of approximately 242 MW. About one hundred mini- and micro- power (MHP) stations, with a total installed capacity of over 93 MW, are in operation in remote localities of the Northern Areas, mainly to provide electricity for lighting purposes, developed and operated by the Northern Areas Public Works Department (NAPWD). Similarly, Sarhad Hydro Development Organization (SHYDO) has developed 11 MHP stations in the NWFP with a total capacity of over 5 MW.

The involvement of the private sector is required to develop small hydropower projects. In this respect, SHYDO has taken a bold initiative to bring in private investment, and, besides handing over various mini- and micro- power stations in operation to the private sector, a number of potential sites are also being leased out. The power policy of the governments of the NWFP provides simple procedures, fiscal and financial concessions and attractive tariffs, aiming at inviting private sector investment basically for captive power for industry. A number of NGOs have also been involved in promoting the installation of MHP in the MWFP, namely the Pakistan Council of Appropriate Technology (PCAT), Aga Khan Rural Support Programme (AKRSP) and Chitral Area Development Project (CADP).

The Alternative Energy Development Board (AEDB)<sup>3</sup> was created in 2003 with the mission to introduce alternative / renewable energy at an accelerated rate so as to achieve atleast 5% share in the energy sector by the year 2015. The Board is also to play a pivotal role in establishing international linkages and engaging in the transfer of the state of the art know-how on renewable energy technologies to local research institutions and industries in Pakistan. The Board is housed in the Prime Minister's Secretariat and the Cabinet Division is providing necessary secretarial support to the Board.

PURE responds to Pakistan's rural development priorities by promoting income-generating agricultural and agro-processing practices, rational use of natural resources and poverty alleviation. The project will build on a concerted effort among public, private as well as NGOs and local partners to reach the above goals. Furthermore, the combined cash and in-kind contributions of the financing of off-grid MHP investment will come mainly from the Federal Government, PPAF, private sector, commercial sector and through community investors.

---

<sup>2</sup> Though there is no internationally recognised definition, "small-scale hydropower" units are generally categorised as micro (less than 100 kW capacity), 'mini' (100 kW to 1 MW) and 'small' (above 1MW and up to 5 MW). In this report we use the acronym MHP for 'mini- and micro hydropower'.

<sup>3</sup> The Board is composed of representatives from the Ministries of Finance, Water and Power, Petroleum and Natural Resources



## **PROGRAMME AND POLICY CONFORMITY**

### **PROGRAMME DESIGNATION AND CONFORMITY**

The activities proposed under PURE will remove important barriers to the adoption of mini and micro hydropower (MHP) technologies for off-grid application in Pakistan, including technological, social-institutional, cultural, policy-regulatory and market-financial barriers. PURE is fully consistent with GEF OP#6: Promoting the adoption of RE removing barriers and reducing implementation costs.

The Project will contribute in meeting strategic GEF priorities in this case the implementation of renewable energy technologies (RET), predominantly mini/micro hydropower (MHP), that is linked with productivity enhancement of value added agricultural products and income generation of micro-enterprises, being made sustainable through stakeholder engagement in MHP management as well as local river basin management.

PURE will contribute to the implementation of UNFCCC COP-7 decision of the framework for development and transfer of technologies. This framework emphasizes the need to remove barriers and provide positive incentives for technology transfer projects, and to integrate technology transfer objectives in national policies. It also identifies the enhancement of skills in the adoption, adaptation, installation, operation and maintenance of environmentally sound technologies as a key issue (UNFCCC COP-7, 2001).

### **PROJECT DESIGN (INCLUDING LOGFRAME AND INCREMENTAL REASONING)**

#### **Background and Project Rationale**

Rural electrification has always been a central objective for power sector reforms in Pakistan. But there is no firm Government policy for the development of decentralized power supply. From the 170,000 villages having no access to electricity, about 40,000 are planned to be connected to the national grid within the next decade. The remaining ones have to be supplied by decentralised options, of which only mini and micro hydropower (MHP) can provide sufficient capacity to provide power for social and productive uses to initiate rural economic development.

The Chitral District in the northern part of Pakistan (NWF Province) is one of the remotest and isolated regions in Pakistan inaccessible by road during winter months. Chitral's population stands at 369,000 (2004), of which almost 90% reside in 463 rural settlements, ranging in size from 20 to 3,573 inhabitants. Chitral town is the only urban settlement in the district, with 20,622 inhabitants. Farming, livestock (sheep, goats) and remittances from unskilled migrant labour are the three major sources of livelihood. Main crops are maize, rice, barley and wheat. Besides cereals for subsistence households cultivate vegetables like potatoes, chilies, onions and fruit trees. Only 24% of the population is working in a sector outside of agriculture, mostly in public services (17%) or private businesses.

Grid-supplied electricity is only available in Chitral Town, the district centre and its vicinities, supplemented by some 4 MW of hydropower. There are no plans for grid extension to these northern areas. In the district, some community or private-based MHP are installed (in total some 400 kW), supplying some 400 households that live in village centres. Due to this limited capacity and power availability (only in the evening hours); the use of electric household appliances is limited. The demand for electricity is indicated by the fact that higher-income households often have bought such appliances, hoping that their use will be possible in future. Richer (urban) households can afford the use of alternative sources of LPG and kerosene for cooking and heating, but are affected as well by unsure supply during the winter months, when roads are often closed for long periods of time<sup>4</sup>.

---

<sup>4</sup> Fuel wood is the major source of energy for cooking and space heating (the latter particularly during the severe winter months). About 94-100% of urban and all rural households use wood with a consumption of 9.3-12.1 tonnes per year, respectively. Urban households use alternative sources (LPG and kerosene), but unsure supply during the winter months (closed roads) lead to increased

In terms of productive uses, the area has economic growth potential in processing mineral resources improved agriculture and horticulture and the local processing of these products, handicrafts (in particular textiles for which the area is well-known) and workshops for daily repairs and manufacture of small articles. In the near future, eco-tourism (mountaineering and trekking) has high potential. Currently, the lack of access to electricity hampers the development of these activities, as no electric equipment can be utilised. Mechanization level in agriculture is low; some diesel engines are used for milling (apart from water mills), while threshing is done by tractors.

At the local level, a main barrier is formed by the general insufficient technical skills within the community to be able to manage, administrate and operate a MHP station. Experience with the existing MHPs in the district shows that equipment is often not used to its optimal extent or run without proper maintenance. The tariffs are often so low that spare part replacements cannot be purchased in case of malfunction or breakdowns.

#### Problem description and barrier analysis:

Mini/micro hydropower (MHP) is definitely the least-cost option when compared with other energy options in Chitral area. In addition, supply of gas, kerosene and diesel can not be assured during at least five months in winter (closed roads). Necessary storage facilities require additional investments and running costs. Extension of grid is also not economically viable due to the large distances and comparably low demand; in fact calculation in the above-mentioned socio-economic study show that the cost of extension and current tariffs would exceed the local MHP tariffs used by 100%.

Of the estimated potential of 1,000 MW for small-scale hydropower (mini, micro and small hydropower stations less than 5 MW) available in the northern mountainous regions less than 1% has been developed, because of a number of barriers that hamper the development of MHP.

Lack of funds, high operation and maintenance cost, poor revenue generation and a general lack of viable business models for MHP have led to the abandonment of MHP projects for rural electrification. Recently, SHYDO has leased out some of the problematic MHP stations to the private sector or NGOs.

#### Policy and Institutional Barriers:

There is no firm national-level government policy for the development of decentralised power supply. Traditionally, electricity supply policy and strategies have focussed on central supply options (the national grid) rather than decentralised power supply options and, within the hydropower sub-sector, policy has focused on developing large-scale projects, rather than small-scale hydropower. Development of small-scale projects (less than 50 MW) is within the jurisdiction of the provincial governments. The efforts of the provincial governments to develop small-scale hydropower have not improved the rural power supply situation much.

At the district level in Chitral, there is no entity that promotes and manages off-grid electricity options and, there is no structured dialogue between government agencies, local government, potential MHP developers, NGOs and community organisation on the role of MHP in electrification and rural development in general. Typically, energy infrastructure development, natural resources management and economic development are seen and undertaken as isolated activities. In terms of management, effective business models have not been developed yet.

---

wood consumption. Main wood resources are in the valleys of southern Chitral, but these resources are under persistent pressure from land clearing, cutting and overgrazing.

### Capacity and Management Barriers:

In general, (large-scale) hydropower has a long tradition in Pakistan and sufficient engineering and technical know-how is available. However, the design of small-scale units (below 5 MW) requires special skills and techniques to overcome problems, such as power stability and optimal design (water availability, low load factor and high per unit cost. For example, only some 3 local turbine manufacturers make micro turbines (up to 100 kW) and there is only one generator manufacturer (Siemens). In general, the MHP sector is lacking local manufacturing and after-sales (repair) capacity and insufficient planning know-how. Consequently, many turbines are imported from China.

MHP stations require skilled operators and management staff. As opposed to individual house supplies (e.g. solar home systems, individual diesel generators), hydropower plants generate electricity centrally. Consumers are supplied through a small isolated grid. Thus, consumption has to be measured, read and billed by a central management unit. Management is one of the biggest obstacles to be found in both central grid and decentralized supply systems in rural areas in Pakistan. The far distances, low load factor (low load factors, as stations are only used in the evening hours) and scattered settlement structures combined with almost non-existent support structures like bank accounts, communication facilities and difficult control of illegal access to electricity makes the billing and revenue collection a tiring and time consuming task, resulting in very low rates of paid bills. Local technical skills are often not sufficient to repair and even maintain the equipment in a proper way. Thus, equipment is not used to its optimal extent or is run without proper maintenance. In case of malfunction or break downs, replacements can not be done due to lack of funds (as tariffs are not set to cover cost of maintenance and spare part replacements, let alone of future reinvestment needs).

### Productivity Barriers:

Creation of rural jobs and income must be based on local resources and opportunities, through the increased production and local processing of agricultural products and expansion of the local service sector (e.g., workshops, tea houses and trading shops). However, to initiate such a self-driven local economy growth, a number of pre-conditions must be met simultaneously:

- Availability of affordable electricity to provide lighting and run machinery and equipment for local manufacturing and processing of local goods and machinery as well to provide social and business services.
- Technical skills to operate equipment and machinery.
- Business skills to run a small business or enterprise on a profitable basis and to approach regional and even national markets.
- Finance to buy equipment and machinery.

### Project Strategy and Approach:

Mini/micro-hydropower forms the most cost-effective option for energy supply in the target region, suited to the size and scale of investments that can be promoted for supplying energy services to these isolated areas. In the project, 103 mini/micro-hydro installations will be installed, each provides power to a nearby community in a mini-grid system, supplemented by solar thermal for drying of products on farms or water heating. The capacities of the plants are calculated according to social and productive demand for electricity. Technical training and adequate payment of staff will contribute to the sustainable operation of the MHP plants.

The management concept is that of a local organisation, in which responsibility and decision-making is located as near as possible to the MHP and the beneficiaries themselves. In this model, the MHP plants management structure will be organised as a 'company', owned by the community and overseen by a 'MHP committee' that would also be responsible for proposing and collecting the tariffs and have the means to enforce regulations and fines (in case of non-payments). Operation, transmission and maintenance will be the responsibility of a private leaseholder. In this set-up losses are shared between the lease-holder (in generation and operation) and the community (in the distribution system, including

the non-technical losses). In fact, the economic analysis shows that the MHP station would operate on a full cost-recovery basis after 4-6 years with payback periods between 11-14 years and internal rates of return between 7-12% over their economic life of 25 years. A certain percentage of revenues are reserved for maintenance (spare parts) and as a reserve fund (for major repairs and replacements).

Financing of off-grid MHP investment will come mainly from the national and local government, in coordination with existing donor-funded programmes, such as UNDP. Additional income generated at the local level will allow end users to pay for energy services. Tariffs will be in the order of USD 0.02 per kWh and are designed in a way to ensure sufficient funds for adequate operation and maintenance and future expansion of the energy services (re-investment), taking into account ability and willingness to pay of the various groups of households. This implies that instead of using a monthly flat rate, commonly used in MHP systems in Pakistan, tariff will be consumption-based with the kWhs monitored by meters.

The capacity of the plants (15 MW in total) has been designed according to productive uses rather than households, resulting in a higher load factor (60%) than is usual in MHP projects. Total annual energy demand at the 103 sites will be 4.8 million kWh, of which 57% private households (lighting and appliances), 14% business and social services (NGO and MFI offices, school centres, clinics and community centres) and 29% productive uses (agricultural processing; chilling store for vegetables and fruits; small crafts and skilled trades; shops, restaurants and guesthouse).

PURE-Chitral's strategy revolves around the stimulation of rural development, using MHP technology as a primary input into local productive processes. PURE Chitral will promote the local processing of agriculture and horticultural products (flour grinders, electric threshers, solar dryers with exhaust fan, fruit processing and bottling) animal husbandry (silk worm rearing and spinning, electric sheep sheering) and of traditional crafts and skilled trades (small electric tools for carpenters, tailors, welders, car repair, electricians as well as power for small shops). With the Lowari rail tunnel (giving better access to the region) to come in a few years time, tourism will be developed and this will bring the need for modern business services (telecommunication, electric heating instead of kerosene heaters, e-mail and web pages for reservations). Rather than focusing on providing access to energy as the project objective, PURE envisions MHP as a fundamental input in the development process of Chitral that catalyzes the local processing of agricultural produce into 'added-value' products as well as small enterprises. PURE-Chitral will look into linking local producers with national markets, securing additional income, thus alleviating poverty in these areas and providing resources to ensure the sustainability of the renewable energy initiatives.

In cooperation with financial institutions, financial schemes will be analyzed and adapted for financing the equipment and facilities needed for productive uses of energy. Emphasis will be laid on using existing micro-finance institutions (MFIs) in the area. These MFIs can provide loans for small investments for equipment and machinery and to small business, ranging from USD 100 - 10,000 (or even up to USD 80,000) at 14-18% interest rates.

The before-mentioned socio-economic study has estimated the economic benefits after 3 years of introducing MHP at the 103 sites; it mentions annual value-added of at least USD 475,000 from the MHP stations itself (revenues), improved productivity in local mining (marble cutting in Shogore), agriculture (irrigation) and animal husbandry (wool carding and spinning), local processing of agricultural products (fruits, vegetables, maize, wheat), increased productivity in crafts and skilled trades (carpentry, tailors, saw mills, repair shops) as well small shops (washing and laundry, restaurants, guesthouses) and a total additional income of at least USD 6,420,000-for the households.. Furthermore, creation of skilled jobs at the MHPs and increased new employment (or self-employment) in the above-mentioned productive uses for more than 18,000 households.

In order to develop the micro and mini-hydro resources, there is a need for preserving water and forest resources at the watershed level. PURE-Chitral will provide the necessary assistance to establish stakeholder committees for the integrated management of land and water at the watershed level and for the development of community-level forest management plans (southern Chitral) and

afforestation/reforestation (northern Chitral). These actions will be linked with local environmental and land-use planning and prioritization. Therefore, integrated management of watersheds will result in securing water and electricity supplies, by reducing the risk to deforestation and soil erosion.

At district level, an implementation structure will have to be established or an already established local development organization will be supported to play this role. This agency, referred to as A-for-PURE (AEDB) will be responsible for planning, design, and supervision of MHP (and other renewable energy technologies) at selected sites, assessment of potential productive uses, involvement of village organisations in local management, business services (information, training, marketing support) as well as monitoring and evaluation activities, in cooperation with authorities, donors, NGOs and service providers. Legally, A-for-PURE will be a NGO or private ('not-for-profit') company with stakeholders of concerned government offices, NGOs and private sector. Until the time that the A-for-PURE is established and has sufficient critical mass and capacity built to assume the above-mentioned tasks, AEDB will act in this capacity.

PURE-Chitral will develop and propose regulatory and policy instruments to promote decentralised energy options, linked with productive uses of electricity, as part of a policy framework for rural electrification. At the national level, PURE-Chitral will promote a policy dialogue between government, donors, NGOs and private sector on the linkages between rural energy supply, rural development and natural resources management.

#### Project Objectives:

This project aims at removing the before-mentioned barriers to mini/micro hydropower (MHP) in the District of Chitral in the northern part of Pakistan, one of Pakistan's most remote and isolated areas. Based on a socio-economic study done as preparation for this MSP proposal<sup>5</sup>, 103 sites have been selected.

The project goal is "*to reduce greenhouse gas emissions generated by replacing and avoiding the use of diesel engines for productive uses, kerosene for heating and diesel-based village mini-grids*". This will be achieved by removing the barriers for the development of 15 MW of off-grid RET applications (basically mini/micro hydropower, supplemented by solar thermal where appropriate). An additional 25 MW of off grid RE are expected to materialize as a result of the installation of more MHPs in Chitral District over the next 10 years.

The objective is "*exploitation of indigenously available small hydropower resources integrated with environmentally sustainable development and poverty reduction in rural areas*". Under the GEF-supported alternative scenario, the value added resulting from a '*productive use of energy (PUE)*' programme will contribute to sustainable development in rural areas, seeking to bring additional income and employment to the local population. Also, PURE Chitral will seek increased local social benefits, such as basic electricity for households and public and social services.

The project has 4 main outcomes that will contribute to the removal of the identified barriers within the four-year framework of this medium-sized proposal. These outcomes, and their associated outputs and activities are listed below:

#### Outcome 1: Development of 15 MW of MHP schemes for PUE in the 103 sites selected in the PURE-Chitral project

103 mini/micro hydropower (MHP) installations will be installed in different clusters, each providing power to a nearby community through a mini-grid system, (supplemented by solar thermal for drying of

<sup>5</sup> The barriers of technical, institutional, social and economic nature were identified in the study Productive Uses of Renewable Energy in Chitral District, Pakistan. (GTZ, 2005)

products on farms, if appropriate). The project sites were selected based on the results of the socio-economic study *Productive Use of Energy in Chitral District, Pakistan*. The project will promote participation in project ownership and municipal agreements that support and buy into project implementation.

#### Output 1.1 *MHP planned, designed, financed and constructed in the 103 selected areas.*

##### *Activity 1.1.1* Detailed technical design, financial set-up, tendering and contracting

Suitable designs for MHP stations are elaborated at the selected sites, by means of detailed technical designs and dimensioning and cost calculations. Capacities are calculated according to the productive demand estimates of the socioeconomic study. Detailed bill of quantities and tender documents for the selected MHP projects will be prepared, followed by conducting the call for tender, tender evaluation and contract negotiations.

##### *Activity 1.1.2* Construction and installation

The activity includes importing equipment and accessories that can not be produced locally; supervising and coaching the implementation of the proposed 103 MHP projects and finally the construction and/or installation of the equipment and civil works (weir, intake, spillways, de-silting basin, headrace, forebay, penstock, power house civil structure, tailrace, turbine, generator, automation equipment, transformer, switchgear, transmission and distribution lines, house wiring).

It should be noted that GEF will not finance the procurement of hardware nor the construction and installation; The committed funds from various sources are given in the table on Page-9. This co-financing includes contributions from PPAF, PCRET, private/commercial sector, community investments. The villages are used to communal work as they regularly have to repair irrigation channels and their roads. In the socioeconomic study villagers expressed their willingness to contribute to the construction.

#### Output 1.2 *Local capacities strengthened for MHP management and operation*

##### *Activity 1.2.1* Design of appropriate private or community operation and management structure

The management concept is that of a local organisation, in which responsibility and decision-making is located as near as possible to the MHP and the beneficiaries themselves. In this model, the MHP plants management structure will be organised as a 'company', owned by the community and overseen by a 'MHP committee' that would also be responsible for proposing and collecting the tariffs and have the means to enforce regulations and fines (in case of non-payments). Operation, transmission and maintenance will be the responsibility of a private leaseholder or village association. In this set-up losses are shared between the lease-holder (in generation and operation) and the community (in the distribution system, including the non-technical losses).

##### *Activity 1.2.2* Design of a tariff structure to cover costs of operation and maintenance (O&M) and re-investment (but taking into account willingness to pay)

As mentioned before, tariff structures are introduced taking into account the ability and willingness to pay on one hand and the revenues required for a sound plant operation on the other hand. The permanent cash income, generated by the productive uses, is an important element in the ability to pay for services at the community level and thus the income situation allows for tariff payments. Tariffs will be in the order of USD 0.02 per kWh and are designed in a way ensuring sufficient funds for adequate operation and maintenance and future expansion of the energy services (re-investment). All households

will in principle use meters and pay according to their energy consumption (in kWh), unlike using a monthly flat rate, commonly used in MHP systems in Pakistan<sup>6</sup>.

*Activity 1.2.3 Training of local personnel to install, operate and maintain MHP (technical, managerial, administration)*

Training and qualification of local operators and administrators are necessary for the sustainable operation of the MHP station. Where technicians are concerned, the emphasis will be placed on developing their skills to install, operate and maintain new MHP equipment, energy enterprise management and helping them to train others in the project area, based on a 'good practices' manual (see activity 4.3)

*Activity 1.2.4 Support for stakeholder involvement and local organizations in MHP development*

This activity includes mobilization of the self-help potential by involving local community organizations. In all the five areas, the inhabitants have created village organizations (VOs) and women organizations (WOs), according to different tasks, needs and activities. Sometimes these groups have clustered themselves in local development organizations and their leaders are well trained and very often speak English. Elected village or union councilors are often members of these VOs as well. The activity will also focus on the linkage with local government structures (village, union, division, or district).

**Outcome 2: Development of productive uses of energy model (PUE) in the 103 selected areas.**

The aim of power supply is to provide enough electricity to secure three tasks:

- Basic electricity for all households to use electric appliances effectively
- Provide public and social services, such as schools and health care centres, and
- Enable the use of electricity for productive value-adding, employment and income-generating activities.

The main productive uses of energy are:

- Processing of agricultural and horticultural resources (threshing and winnowing; wheat, barley and maize grinding; fruit drying, processing, packaging or bottling; walnut oil extraction). Electricity uses include saw mills, electric threshers, flour grinders and hammer mills, exhaust fans for solar fruit drying and chilling stores for vegetable and food storage (ventilation, cooling, lighting)
- Animal husbandry resources (sheep and goat shearing; raw wool processing; chicken hatching). Electricity uses include sheering equipment, carding equipment and heating lamps
- Skilled trades (carpenters; tailors; welders; electricians). Electricity uses include electric carpentry tools (saws, drills, routers), tailoring equipment (iron, sewing machine, lighting), welding equipment, compressors for tires and painting, electrician tools (soldering and radio and TV repair tools)
- Business services; photo services; photocopying; Internet services; laundry shop; grocery and small retail shops; restaurants and guesthouses. Electricity uses include lighting, refrigerators, cookers, lighting, radio and TV, heaters. Chitral District has also a large tourist potential. The tourist infrastructure is not yet well developed, and each area needs facilities such as guest houses, restaurants, telecommunication and internet access (web pages for reservation).

---

<sup>6</sup> Only poor households will be allowed to pay a flat rate and use one fluorescent 40 W tube free of charge.

- Mineral exploitation. Surveys have assessed the potential for marble and slate cutting and faceting and polishing of gems and semi-precious stones. Electricity is needed to power slate and marble cutting machinery.

Electricity would be very important for the further growth of home industry of women and would facilitate their evening work in many ways (shearing and processing of wool, sewing and stitching, wood carving, goat hair carpet weaving, and other souvenir products). In other areas as well spinning and weaving is part of women's daily life and the tourists could be a new market for their products. Also, the use of domestic appliances (energy-saving stoves, cookers, irons) increases the options for women to save labour and time. Therefore, gender awareness will be quite important for the project and help to decide between different options.

### Output 2.1 Investments in and financing of productive uses and income-generating opportunities

#### *Activity 2.1.1 Investments in equipment and appliances for productive uses and business services*

In cooperation with financial institutions the project develops and catalyzes the implementation of financing schemes for productive use. Various delivery models (vendor financing, loan guarantees, leasing soft loans) are analysed with respect to their suitability for financing productive use of energy. Emphasis is laid on the utilization of regular micro credit facilities. These financial institutions can provide loans for small investments for equipment and machinery and to small business, ranging from USD 100-10,000 at 14-18% interest rates. It should be stressed that no GEF funds will be used to acquire equipment or appliances. GEF support will be sought in particular to build capacity to assess urgently required lines of credit for working capital for productive uses in the context of small businesses.

### Output 2.2 Local capacities strengthened for the development of income-generating opportunities and productive uses of energy (PUE)

#### *Activity 2.2.1 Analysis of local and national markets for 'value-added' products*

In this activity, market studies will be conducted to define the expected commercial value of local products and to strengthen links with regional and national markets and develop plans to market 'value-added' products.

#### *Activity 2.2.2 Training and capacity building (farming households, small entrepreneurs, community leaders) in productive uses*

The project will design and catalyze the implementation of capacity building programs and financing schemes for the productive use of renewable energy applications. Capacity building efforts will target farming households and small rural entrepreneurs at the community level, emphasis will be placed on enhancing farmer users' and vendors' skills to assess different production options and to benefit from the new equipment, new product development as well as micro-enterprise development and management. Capacity building with this target group will be closely linked to explaining the role of electricity and electric equipment and appliances and how to get access to financial support.

### **Outcome 3: Strengthened capacity for MHP planning and watershed management**

At district level, implementation concepts have to be established/identified which are locally based, but that can also be disseminated to other areas in Pakistan. A local implementation agency will be established or an already established local development organization is to be nominated and its capacity strengthened to play this role. In case of using hydropower as renewable energy resource, water shed management is essential to ensure its sustainable operation. Consequently, a capacity building component is included to strengthen local processes to improve watershed management (and reduce vulnerability to deforestation and climate change impacts).



### Output 3.1 *Participatory management of natural resources in the watershed areas of the MHP stations*

#### *Activity 3.1.1* Establishment of enabling environment for the management of natural resources in the watershed areas

The development of mini-hydro resources will require actors to be brought together not just within the context of political or administrative boundaries (union, division), but based on natural geographic units or river basins. It will also help ensure the long-term supply of freshwater resources and ecosystem management. Besides securing a constant supply of freshwater and electricity, integrated river basin management will help to provide a number of other environmental goods and services to local communities, including agricultural production sources, timber, soil erosion control and climatic vulnerability measures. The concept promoted in PURE-Chitral consists of integrating community-based watershed management, in cooperation with the local authorities and grassroots organizations that have interest in different aspects of water use (potable water, irrigation, sanitation, fisheries, energy, etc.). The PURE project will work with ongoing or future projects in Chitral District to induce leverage from other development activities that focus on area of land use management, reforestation, sustainable agriculture and soil and water conservation. The activity includes a capacity building component to strengthen local processes to improve watershed management

### Output 3.2 *Self-managed unit (A-for-PURE) to promote MHP development in Chitral District*

#### *Activity 3.2.1* Management and administration of the PURE-Chitral project

A "Project Management Unit" will initially be established under AEBD, as implementing partner for the project. Its main functions to run the day-to-day operations of PURE-Chitral, i.e., to plan, design and supervise the implementation of the MHP stations in the 103 selected areas, to assess the potential for local management and productive uses, to subcontract and monitor the work performance of partners to administrate the PURE-Chitral project, to provide regular reporting on the project's progress as part of monitoring of the results and impacts of the project. The PMU will start functioning under the local implementing agency, A-for-PURE, as soon as the latter will be operational (as described in activity 3.2.3)

#### *Activity 3.2.2* Capacity strengthening on MHP and PUE at district level

This activity includes an assessment of current capacity of commercial and micro lending organizations, NGOs, field workers and local government officials in Chitral District, followed by "training of trainers":

- Operation and maintenance of RETs and on energy enterprise management, based on the 'good practices' manual (see activity 4.3)
- Facilitation on the role of MHP and lending for PUE
- Productive uses (new product development, micro-enterprise development and management)

#### *Activity 3.2.3* Establishment of the "Agency-for-PURE" in Chitral Town

It is proposed to develop the PMU of PURE-Chitral, supervised by AEDB into a self-managed, locally-based entity, referred to as "Agency for Productive Uses of Renewable Energy" to ensure continuation of activities after the project's end. Legally speaking, "A-for-PURE" will acquire the status of foundation/NGO (supervised by concerned partners from government, NGOs and private sector) or of a not-for-profit private company (with shareholders of concerned partners). The focus will be on mini/micro hydropower, linked with productive uses of energy and sustainable management of natural resources.

The activities of "A-for-PURE" will be comprised of:

- Elaboration of project proposals
  - Resource assessment and screening on technical and socioeconomic feasibility of sites in a participatory approach with all stakeholders concerned.
  - Intensive field reconnaissance, including load forecasting, socioeconomic, hydrological and environmental surveys
  - Technical and socioeconomic evaluation.
  - Elaboration of project profiles (project design, cost-benefit analysis, ownership-management model, financial plan and tariff structure).
  - Presentation of profiles to government and donor organizations.
- Awareness raising and dissemination of information to villagers, NGO, private and government organizations on MHP, productive uses of energy and income-generating opportunities.
- Capacity building and training of operators and administrators of MHP stations as well as vocational skills training on using certain productive machinery.
- Monitoring and evaluation of experiences with MHP and productive uses.

**Outcome 4: Conditions for project sustainability are established.**

In order to ensure sustainability, the project will also propose specific policies and regulations that support the use of RETs for off grid energy uses. While the proposed policy inputs are not essential for the investments included in this initiative, they are vital to ensure a level playing field for MHP application for decentralized power supply.

**Output 4.1 Capacity strengthening of the MHP sector (private, NGOs, government)**

*Activity 4.1.1 Analysis of the capacity strengthening needs in the MHP sector.*

This activity will identify barriers in technology infrastructure and support system problems with regard to the renewable energy industry, focusing on off-grid applications (quality and standardization, imports vs. local manufacture of systems and spare parts, skills development, local maintenance and repair facilities). Capacity building needs will be defined for RET operators as well as business that sell and distribute RET equipment.

*Activity 4.1.2 Capacity Strengthening*

This assessment will review manufacturing, quality assurance, standards and code of practice, operation and maintenance, market development and promotion, innovative financing mechanisms that supplement government subsidies and link productive end-uses as well as enhancing access to finance for MHP companies (e.g. to stock spare parts or to enable vendor financing and soft loans). As key factors for success, the project will design and catalyze the implementation of capacity building programs and financing schemes for the productive use of MHP applications. The capacity building efforts will target financial institutions, NGOs, private sector developers and national and provincial government agencies.

**Output 4.2 Proposed strategy for electrification of rural areas**

*Activity 4.2.1 Development of regulatory and policy instruments.*

Regulatory and policy instruments will be developed to promote both decentralised rural energy supply by renewable energy resources and productive use of electricity. A rural electrification strategy and concept is elaborated comprising necessary regulatory and political instruments, technical framework conditions and solutions, and cost and benefits. The concept also includes principles for a national productive use programme as a key component to rural development in Pakistan as well as the institutionalization of cooperation between the key players at government level, such as AEDB, Ministry of Water and Power, Ministry of Environment and non-government main stakeholders.

*Activity 4.2.2 Improved policy dialogue on the linkages between energy supply, rural development and environmental issues*

At the national level, PURE-Chitral will promote a policy dialogue between government, donors, NGOs and private sector on the linkages between rural energy supply, rural development, natural resources management and climate change mitigation and adaptation.

**Outcome 5: Monitoring, Learning and Feedback**

**Output 5.1 Dissemination of information of PURE-Chitral project results and international experiences with renewable energy development and productive uses of energy**

Activities under this output include the dissemination of innovative approaches, lessons learnt and good practices to local stakeholders and stakeholders at national level. This will be done by means of workshops and seminars as well as publications, such as the formulation of 'good practices' manual for off-grid RET projects (including design, feasibility and cost analysis, tariff structure, links with productive uses, environmental impact assessment, stakeholder involvements and institutional-organizational aspects as well as containing lessons learnt from other projects).

**Output 5.2 Evaluation and monitoring**

The project will establish and implement a system for monitoring and evaluating results, based on the logical framework of indicators and verifiers (given in Section II of this project document). Specific indicators linked to productive uses of energy will be analyzed and refined as necessary. Results and impacts of project activities will be measured and shared through workshops and publications<sup>7</sup>.

**Key Indicators, Assumptions and Risks**

**Key indicators of success for the project include:**

*Energy, environmental and climate change:*

- Multi-sectoral investment (government, finance institutions) in MHP technology
- Adoption by farming households, agro-processing units and micro/small enterprises of MHP-generated power for productive uses to enhance productivity in their operation and produce new 'value-added' products
- Reduced greenhouse gas emissions (GHG) from avoided use of fossil fuels (diesel, kerosene) in households, social services and productive uses the 103 MHP-village grid systems.
- Increased capacity at local and district level to assess and manage environmental risks (deforestation and change impacts) through an integrated watershed management approach.

*Institutional:*

- An enabling environment, adopted by the Government, with consolidated policy and regulation for off-grid RET in rural areas.
- Strengthened river basin committees and strengthened institutional cooperation between agricultural/agro-processing and energy sectors.

---

<sup>7</sup> Baseline data on energy generation and use are collected during project implementation and indicators will be developed for different levels of project activities. The baseline will be established by the end of the first year of project implementation. Indicators to measure project impact will make use of the programme-level indicators developed for the GEF Climate Change Focal Area, such as data on energy production and installed capacities, technology costs, business and supporting services development, financing availability and mechanisms, policy development, awareness and understanding of technologies, energy consumption, fuel-use patterns, and impacts on end-users. At the project level indicators also need to describe impacts, e.g., the number of changes in employment opportunities, revenues and profits. At overall objective level the development of rural economy, poverty and natural protection are to be measured.

- Strengthened capacities of stakeholders (government, MHP companies, financial sector, NGOs) in identifying, designing, promoting, marketing, investing, installing, operating and maintaining MHP systems for rural electrification, linked with productive uses development.
- Strengthened markets of RE applications in Pakistan.

*Economic and social:*

- A considerably increased financial flow towards productive uses (associated with MHP projects) in the selected municipalities
- Enhanced income generation and employment in rural communities, due to enhanced markets for goods (agriculture, handicrafts, others) produced and increase in small and medium business development
- Social and employment benefits resulting from increased availability of energy for social services, domestic and productive uses;
- Contribution to sustainable rural livelihoods and poverty alleviation.

*Awareness, knowledge and dissemination:*

- Increased awareness of and information about MHP for productive uses in the agriculture and agro-processing and small business development at the local, district and national level in Pakistan.
- Dissemination of project results in other districts of Pakistan and abroad.

Important project assumptions are:

- Long-term financial support and pro-active participation of the Government and its institutions, in particular AEDB, Ministry of Environment and of Water and Power, national economic conditions, favouring income-generating investments in renewable energy and PUE in rural areas.
- Political stability allows cooperation between ministries and with non-government stakeholders as well as local democratic governance structures
- The investments in 103 MHPs will go ahead as planned.
- Active interest of local communities to participate in managing water and land resources, enabling energy development for productive uses.
- Potential conflicts between municipalities, communities and private developers regarding shared watershed management, MHP ownership and land tenure can be minimized.

During the project design stage, project risks were closely analyzed and have been minimised by adopting appropriate financing and business models for MHP and PUE development. However, while the project is designed to minimize these risks, some issues are not entirely within the project's control but may affect project implementation. These risks are listed below.

*Social, participatory, institutional:*

- Political unrest in Pakistan affects community participatory processes and the business climate, posing a barrier for investment and lending in this area. While PURE is designed to operate in this scenario, the fragility of political and social structures in this area introduces a level of risk that cannot be completely eliminated.
- Political changes shift the Government's priorities to other areas than PURE-Chitral's objectives, implying that, in the long run, Government contributions for off-grid renewable energy are not guaranteed. While financing for the direct interventions in the PURE project is secured, the sustained commitment and contribution of the Government of financial resources for long-term off-grid electrification is essential.

*Market and financial:*

- Due to the remote location of the project sites in Chitral area, products may be difficult to transport and resources may be difficult to supply, while access to financing for remote communities may be difficult. As much as possible, the earlier-mentioned socio-economic study has taken these issues into account as its criteria for site selection. Furthermore, in the near future the Lowari rail tunnel project will give better access to the Chitral region.
- Variations in market prices for targeted goods and general economic conditions do not allow their financially sustainable production, impeding repayment of loans of RET for PUE investments.

PURE-Chitral's monitoring and evaluation (M&E) strategy will ensure that particular attention be devoted to measuring the above risks and "red flags" are raised in a timely manner. Should any of these risks (or any unpredicted events) jeopardize project implementation; the project management team will be responsible for taking the appropriate measures to adapt the project strategy as necessary, with UNDP and UNDP/GEF support.

**LOGICAL FRAMEWORK:**

**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification	Assumptions/risks
<b>Goal</b>	Reduction of Pakistan's greenhouse gas emissions by replacing fossil fuels with mini/micro hydropower plants (MHPs)				
<b>OBJECTIVE:</b> Development of indigenously available renewable energy resources (MHP) integrated with environmentally sustainable development and poverty reduction in rural areas.	<ul style="list-style-type: none"> <li>At least 2,200 households have gained access to MHP-generated electricity</li> <li>People can pay tariffs that cover cost of O&amp;M and re-investment (due to linkage with productive uses).</li> </ul>	The country will be unable to take full advantage of its small-scale hydropower potential.	The first off-grid MHP project is providing energy for PUE.	<ul style="list-style-type: none"> <li>Project monitoring and evaluation reports.</li> <li>Project publications.</li> <li>Updated Pakistan National Communication.</li> </ul>	<ul style="list-style-type: none"> <li>Social and political stability.</li> <li>Absence of conflicts in project area.</li> <li>No major climate or environmental catastrophes.</li> <li>Stable energy markets.</li> </ul>
<b>OUTCOME 1</b> Development of 103 MHP schemes for productive uses	<ul style="list-style-type: none"> <li>MoUs with co-financing partners and financial closure of project implementation.</li> <li>MHPs constructed and in full operation.</li> </ul>	Continued use of diesel engines for productive use, kerosene for lighting or introduction of diesel-based village mini-grids in the near future.	The first off-grid MHP project is providing energy for PUE.	<ul style="list-style-type: none"> <li>Project and official documentation (feasibility studies, business plans, MoUs, contracts).</li> <li>Bank accounts for each MHP facility to allow for project development and fee collection.</li> </ul>	<ul style="list-style-type: none"> <li>Political stability allows for investment in rural areas.</li> <li>There is strong local government support to develop the MHP projects as well as strong involvement of the community as a sense of ownership and of income-generation opportunity.</li> </ul>
1.1 Planning and construction of 15 MW MHP at 103 sites in Chitral and Northern Areas.	<ul style="list-style-type: none"> <li>Approximately 18,000 connection contracts (households, social services, shops) signed with end-users.</li> <li>Local organizations involved in setting up an enterprise with</li> </ul>	<ul style="list-style-type: none"> <li>No detailed design studies.</li> <li>No modern energy available for most of the households in the remote communities (fossil fuels for productive uses and</li> </ul>	<ul style="list-style-type: none"> <li>103 design studies completed</li> <li>US\$ 3.3 million are available for MHP construction</li> <li>Construction of MHP in 103 sites.</li> </ul>	<ul style="list-style-type: none"> <li>Feasibility study documents, engineering layout and blueprints, business plans and general project documents.</li> <li>Project and legal documentation</li> </ul>	<ul style="list-style-type: none"> <li>Interest, participation and commitment of local communities.</li> <li>Land tenure secures development sites</li> <li>Involvement of local government (union</li> </ul>

**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification	Assumptions/risks
	<p>legal title that run the MHPs in a cluster of selected sites.</p> <ul style="list-style-type: none"> <li>Tariff structure in place and tariff collection by MHP enterprises.</li> </ul>	<p>lighting are often not available in winter months).</p>		<p>available (MoUs between private developers and local authorities and communities).</p> <ul style="list-style-type: none"> <li>Signed contracts for construction of plants.</li> </ul>	<ul style="list-style-type: none"> <li>MHP companies able to provide good quality service in MHP construction and maintenance.</li> </ul>
<p>1.2 Capacity building at AEDB and other executing agencies including local communities involved in construction/operation/maintenance.</p>	<ul style="list-style-type: none"> <li>Annual value added generated by PUE (estimated at around US\$ 1,000,000).</li> <li>Permanent employment about 206 and seasonal employment of about 20,000 persons.</li> <li>Annual income increase doubled against the current per capita income of USD 1 per day.</li> </ul>	<ul style="list-style-type: none"> <li>NGOs and technical assistance concentrates on agriculture and micro-enterprises but without emphasizing energy as a key process input.</li> <li>No local capacity to build, operate, and maintain MHP.</li> <li>Mini-grid and village systems continue to be planned in traditional way (government-planned and managed; insufficient tariff revenues to cover O&amp;M and re-investment, poorly linked with PUE).</li> </ul>	<ul style="list-style-type: none"> <li>Local tariff and fee system is agreed upon and (should at least cover O&amp;M and depreciation cost and possibly river basin environmental cost).</li> </ul>	<ul style="list-style-type: none"> <li>Project progress reports.</li> <li>Legal registry of MHP enterprises.</li> <li>Reports and annual statements by MHPs.</li> <li>Documents elaborated for capacity building component.</li> <li>Records of the financial institution(s) selected to manage the accounts of the MHPs.</li> </ul>	<ul style="list-style-type: none"> <li>Local governance of MHP (community-owned enterprise) is functional.</li> <li>Local collaboration and motivation.</li> </ul>
<p><b>OUTCOME 2</b> <b>Development of PUE in the 103 selected areas</b></p>	<ul style="list-style-type: none"> <li>Number of PUE agreements signed with local communities.</li> </ul>	<ul style="list-style-type: none"> <li>No expansion of PUE and additional income generation in project areas.</li> <li>Rural off-grid areas continue to be seen as risky by local finance institutions.</li> </ul>	<ul style="list-style-type: none"> <li>Electric lighting equipment and appliances acquired.</li> <li>PUE starting (productivity improvement in agriculture and animal husbandry; processing agricultural products;</li> </ul>	<ul style="list-style-type: none"> <li>Project and official documentation.</li> <li>Local entrepreneurs and farmers considered credit worthy and individual credit contracts with financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>Political stability allows for investment in rural areas.</li> <li>There is strong local government support for PUE activities as well as strong involvement of the community as a sense</li> </ul>

**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification (for PUE).	Assumptions/risks
2.1 Investments in and financing of productive uses and income-generating opportunities.	<ul style="list-style-type: none"> <li>Number of trainers required to train engineers and manufacturers of turbines, generators, civil works as well as operators for the cottage industry, planned under the PURE programme.</li> <li>At least 100 male and 100 female community members trained on productive use.</li> </ul>	<ul style="list-style-type: none"> <li>Development institutions continue to focus their activities on relatively less remote areas in Pakistan.</li> <li>The poverty level in Chitral area remains the same.</li> </ul>	<p>skilled trades improvement; business and social services)</p> <ul style="list-style-type: none"> <li>Agreements extending US\$ 200,000 in PUE are signed.</li> <li>Donors and/or local government provide guarantee to support continuity of PUE.</li> </ul>	<ul style="list-style-type: none"> <li>Marketing strategy documents for new 'value-added' products and services.</li> <li>Client records and financing requests received by financial institutions.</li> <li>Annual reports of local NGOs and financial organisations.</li> <li>Local statistics.</li> </ul>	<p>of ownership and income generation opportunity.</p> <ul style="list-style-type: none"> <li>Effective local village (VOs) and women organizations (WOs).</li> <li>Willingness of NGOs and local financial institutions to provide credit for electric machinery and equipment.</li> </ul>
2.2 Local capacity-building for development of income-generating opportunities.	<ul style="list-style-type: none"> <li>Trained person power developed to run cottage industry (skilled and semi-skilled).</li> <li>Stable vegetation cover situation attained.</li> <li>Wood resources managed in a sustainable manner and increase in forest cover due to reforestation/afforestation efforts in watershed management area.</li> </ul>	<ul style="list-style-type: none"> <li>Productive uses developed remain isolated from energy development initiatives.</li> <li>No local capacity to increase productivity or develop new 'value-added' products.</li> </ul>	<p>Training for trainers: at least 30 staff trained from government, NGOs, financial institutions and local government on PUE and MHP.</p> <ul style="list-style-type: none"> <li>At least 50 male and 50 female community members trained to run cottage industry (skilled and semi-skilled).</li> </ul>	<ul style="list-style-type: none"> <li>Documents elaborated for capacity building programme.</li> <li>Project progress reports.</li> <li>Attendance lists of workshop.</li> </ul>	<ul style="list-style-type: none"> <li>Interest, participation and commitment of local groups.</li> <li>Active participation of local governments, NGOs and financial institutions.</li> </ul>
<b>OUTCOME 3</b>	<ul style="list-style-type: none"> <li>RE generation for the</li> </ul>	<ul style="list-style-type: none"> <li>Depletion of natural</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 22,000</li> </ul>	<ul style="list-style-type: none"> <li>Project documentation</li> </ul>	<ul style="list-style-type: none"> <li>Local authorities and</li> </ul>



**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification	Assumptions/risks
<b>Strengthened capacity for MHP planning and watershed development and watershed management.</b>	PUE implemented.	resources and lack of energy development will continue.	households benefit from MHP and PUE activities. • 25% of watersheds in Chitral and Northern Areas managed sustainably by communities, benefiting from PUE.	<ul style="list-style-type: none"> <li>Local workshop proceedings.</li> <li>Local forestry statistics.</li> </ul>	<p>NGOs national level are fully informed thus reducing unnecessary red tape.</p> <ul style="list-style-type: none"> <li>Potential conflicts regarding shared watersheds are minimized and watershed management concepts can be fused with local knowledge and customs.</li> </ul>
3.1 Establishment of relevant capacities at the policy level for promoting MHP and PUE.	<ul style="list-style-type: none"> <li>Capacities of A-for-PURE(AEDB) to plan implement and monitor/evaluate MHP schemes are strengthened.</li> <li>Portfolio of MHP in Chitral and Northern Areas for the post-project period (minimum of 15 MHP projects) developed</li> </ul>	<ul style="list-style-type: none"> <li>Watershed management does not exist under the constraints of lack of interest and resources.</li> <li>Unsustainable use of valuable local wood resources.</li> </ul>	<ul style="list-style-type: none"> <li>Framework for capacity development for A-for-PURE formulated.</li> </ul>	<ul style="list-style-type: none"> <li>Documents, showing number of villages and land area under integrated watershed plans, covering watershed conservation, natural resource management and afforestation plans.</li> <li>Project progress reports.</li> <li>Workshop proceedings.</li> <li>Record of local authorities.</li> </ul>	<ul style="list-style-type: none"> <li>Active interest and participation of local communities, including women.</li> <li>Level of education is sufficient to set up PURE.</li> <li>Active interest, participation and leadership by local authorities.</li> </ul>
3.2 Establishment of a self-managing unit to promote MHP (Agency for PURE).	<ul style="list-style-type: none"> <li>Identification of future sites in Pakistan by AEDB to implement project approach: At least 12 remote sites for the next 5 year</li> </ul>	<ul style="list-style-type: none"> <li>Management structure for decentralised power supply in Chitral is not in place and capacity to implement better electrification will</li> </ul>	<ul style="list-style-type: none"> <li>A-for-PURE established at AEDB.</li> </ul>	<ul style="list-style-type: none"> <li>Project progress report.</li> <li>Mid-term evaluation report.</li> <li>Periodic reports by A for PURE.</li> </ul>	<ul style="list-style-type: none"> <li>Effective communication and coordination with relevant stakeholders (national government, provincial and local authorities, NGOs,</li> </ul>

**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification	Assumptions/risks
<b>OUTCOME 4</b> Conditions for project sustainability are established	<ul style="list-style-type: none"> <li>after project closure.</li> <li>Availability of spare parts at project site.</li> <li>Number of MHP firms (and amount of staff employed) has increased by 25% compared to baseline year.</li> </ul>	<ul style="list-style-type: none"> <li>depend on ad-hoc extra-district interventions.</li> <li>Within policy making at national level, productive uses are not associated to MHP.</li> <li>No information on providers, quality of technology prices or O&amp;M requirement.</li> </ul>	<ul style="list-style-type: none"> <li>Outreach efforts, workshops, publications that disseminate project-relevant information and lessons learned.</li> <li>Official ministry statements on policy and regulation promoting off-grid, RET and PUE demonstrated adaptive management based on monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>Periodic reports by PM.</li> <li>Minutes of meeting of PSC and OSC meetings</li> <li>Project publications and monitoring and evaluation reports.</li> <li>Laws and regulations published in official publications.</li> <li>Mid term policy document regarding MHP and RET.</li> </ul>	<ul style="list-style-type: none"> <li>private sector, financial institutions).</li> <li>Relevant ministries (AEDB, Water and Power, Environment) are committed to off-grid electrification by MHP.</li> <li>Political scenario allows cooperation between the various ministries/departments</li> </ul>
4.1 Capacity strengthening of the MHP sector (private, NGOs).	<ul style="list-style-type: none"> <li>Skilled and semi-skilled staff available in the MHP sector.</li> </ul>	<ul style="list-style-type: none"> <li>MHP development and technology system is not well-structured with lack of capacity for planning, local design, manufacturing and providing inadequate after-sales service.</li> </ul>	<ul style="list-style-type: none"> <li>Gap closure strategy designed (including training programmes for managerial and technical staff).</li> </ul>	<ul style="list-style-type: none"> <li>Document, containing the assessment and recommendations.</li> <li>Project progress report.</li> <li>Technical standards and design manual.</li> </ul>	<ul style="list-style-type: none"> <li>Political and economic stability allows for investment in MHP manufacturing and service companies</li> </ul>
4.2 Proposed electrification strategy for rural areas	<ul style="list-style-type: none"> <li>Electrification strategy fully implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Government funds continue to be diverted to central options (large-scale hydropower) due to lack of policy and regulatory</li> </ul>	<ul style="list-style-type: none"> <li>A plan to integrate RE and PUE is presented and discussed with the government.</li> </ul>	<ul style="list-style-type: none"> <li>Laws and by-laws that allow the policy framework to be implemented are published in official media.</li> </ul>	<ul style="list-style-type: none"> <li>Fossil fuel market price continue to rise, making renewable energy more competitive.</li> <li>Effective leadership by AEDB and concerned</li> </ul>

**ANNEX A: PROJECT RESULTS FRAMEWORK**

(Objectives, outcomes, outputs)	Indicator	Baseline	End-of-Project Targets	Sources of verification	Assumptions/risks
<p><b>Outcome 5: Enhanced awareness regarding RE among communities is achieved.</b></p>	<ul style="list-style-type: none"> <li>• Requests from outsiders to A-for-PURE for information on MHP development in Chitral and number of visits to information centre increases by a rate of 10% per annum.</li> </ul>	<p>mechanisms for off-grid small-scale electricity production and lack of integration with rural development and environmental objectives.</p> <ul style="list-style-type: none"> <li>• Lack of policy dialogue on the linkages between energy supply, rural development and natural resources management.</li> </ul>	<ul style="list-style-type: none"> <li>• Information and awareness centre established within two years of the project.</li> <li>• Progress towards implementing the M&amp;E plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Publications</li> <li>• Website</li> </ul>	<p>ministries.</p> <ul style="list-style-type: none"> <li>• Active participation by NGOs and private sector in policy dialogue.</li> <li>• Political stability.</li> </ul>

## INCREMENTAL REASONING

The goal of the project is to reduce greenhouse gas emissions by the avoided use of diesel-based generators and village mini-grids in isolated areas. This will be achieved by installing and operating up to 15 MW of off-grid RET applications (mini/micro hydropower, supplemented by solar drying). A conservative estimate of the indirect impact of this project, from expanded RET on-grid and off-grid developments that are triggered by the proposed barrier removal activities, results in at least 1,890,868 tCO<sub>2</sub>eq reductions.

The objective of the project is exploitation of indigenously available renewable energy resources integrated with environmentally sustainable development. Under the GEF- supported alternative scenario, the sustainable use of locally available water and energy resources for processing creates 'value added' to local products and services (processing of agricultural crops and small enterprises). This has the potential to provide communities with higher employment, better sources of income and higher living standards. The value added resulting from a 'productive use of energy (PUE)' programme will contribute to sustainable development in rural areas, seeking to bring employment and other economic as well as social benefits to the rural population.

### Baseline scenario

In the baseline scenario, the MHP potential in Chitral area will continue to be underdeveloped and the energy situation will be characterized by the following aspects:

- Communities will remain dependent on the use of inefficient, scarce and expensive sources of energy, such as wood, diesel engines for some productive uses, kerosene for lighting and LPG for cooking.
- Remote communities will lack access to reliable, modern sources of energy and this will continue to constrain productivity and development of new 'value-added' products and services and hinder the improvement of living conditions.
- Mini-grid MHP systems continue to be planned in a traditional way, i.e., top-down with limited local participation, not financially sustainable (e.g., tariff revenues that are insufficient to cover O&M and re-investment) and badly designed (low load factors).
- Local communities will have no access to financial resources to develop the value -added activities and productive uses stemming from access to energy will not be examined or fully understood, thus limiting the return on investment in renewable energy.
- The lack of linkage with productive uses and value-added activities implicates low load factors, thus limiting the return on investment in MHP and sustainability of the stations.
- Few government resources will be directed to MHP investment, and the majority of available resources will be dedicated to conventional grid extension. Private investment in renewable energy will not occur because isolated MHP systems are not perceived as an attractive investment and because a regulatory and institutional framework for off-grid electrification is not in place.

The baseline course of action leads to negative global environmental impacts, as the main sources of energy in remote mountain districts, such as Chitral, will continue to rely on fossil fuel based sources (diesel, kerosene). The focus on grid coverage extension will delay investment in MHP and local authorities will opt for diesel-based grid systems for off-grid electrification. The consequences in terms of GHG emissions to the atmosphere are calculated in Section II, dealing with the incremental cost and logical framework analysis.

### GEF alternative scenario:

The fundamental concept is to promote renewable energy in communities where the value of local goods will be enhanced through productive uses. This will secure additional income in these areas and provide financial resources to ensure the sustainability of the renewable energy initiatives. This is an innovative approach compared to the more traditional one where the main focus was on meeting basic consumptive energy needs, such as lighting. Energy becomes a fundamental input of an operational framework that catalyzes a value-added productive chain.

Existing barriers for the dissemination of productive uses of energy (PUE) generated by renewable energy technologies (RET) will be addressed by fostering a multi-stakeholder dialogue at local and national level to respond to demand-driven community needs for PUE. The executing agency will catalyze agreements to materialize commitments to income generation activities that mitigate greenhouse gas emissions through renewable energy technologies. Also, the project will provide a set of tools for decision making, planning, implementation, and monitoring, to promote the sustainability of innovative options for natural resources management through targeted capacity building and stakeholder strengthening.

The project's strategy therefore integrates various dimensions: (i) *mitigation* of GHG emissions through promotion of mini/micro hydropower (MHP) that is linked to (ii) *income generation and productivity enhancement* through productive uses of energy, being made sustainable through the incorporation of (iii) *adaptation to climate change* considerations - a close partnership has developed between UNDP Pakistan and the Ministry of Environment that consider natural resource management practices in the watershed area in which the MHP will be located, and (iv) by providing the necessary *support to relevant national-level policy making* and regulations and a multi-stakeholder dialogue and long-term collaboration, that are required for successful replication of the project in the national context.

The alternative scenario to be achieved through the implementation of this project is characterized by:

- Increased local income from productive uses of RE and adequate support services, including adequate market information and access as well as accessible financing mechanisms both for farmers as well as small shops and enterprises
- Increased use of and knowledge about MHP for productive uses in rural areas with a sufficient level of technical services and financial support to warrant a sustainable operation and sufficient local levels of income (from the productive uses) to cover, at least, the O&M costs of the MHP installations.
- An enabling environment for MHP projects, with mechanisms that guarantee the evolution of policies towards off-grid electrification at the provincial and national level and the sustainable management of watershed areas.

### **System boundary:**

The geographical boundary of the proposed medium-sized project is Chitral District in northern Pakistan, where an anticipated 15 MW of MHP for productive uses will be installed over a period of 4 years.

### **Additional benefits:**

Small-scale hydropower projects contribute to increased investment in rural areas, mobilize commercial bank participation in productive uses, reduce dependence on expensive and intermittently available fossil fuels (diesel, kerosene); improve the country's energy balance/mix and contribute to economic development activities in often remote areas and lastly they generate employment benefits at the local level (productive uses of energy) and the national level (local assembly and partial manufacturing of hydropower equipment).

**Costs:**

The total cost of the proposed initiative is US\$ 19,231,000; the total incremental cost of the GEF alternative is US\$950,000. The co-financing consists of cash and in-kind contributions of US\$ 18,281,000 coming from the Federal Government, PPAF, private and commercial sector, local community investors and UNDP.

**Emission reductions:**

The calculation is based on the amount of carbon displaced directly by the direct investment in renewable energy technology (RET) during the implementation of the PURE-Chitral project, i.e., the investment in 15 MW of village mini/micro hydropower installation at a direct investment in hardware and engineering more than USD 3.56 million.

The following assumptions are used:

- Energy demand of the 15 MW stations is 4,815 MWh annually, assuming a utilization factor of 60% (which is relatively high thanks to the contribution of productive use in village energy demand during the day in addition to consumptive demand that concentrates on evening hour lighting)
- Fuel consumption of 0.36 liter/kWh and CO<sub>2</sub> emission of diesel at 3.6 kg/liter.

Given the availability of hydro resources in Pakistan, the replication potential for this initiative is theoretically quite large. A conservative estimate is that an additional 25 MW of RE will be developed by the Agency-for-PURE in Chitral District, the agency dedicated to MHP development and established/strengthened as part of the PURE-Chitral project.

**SUSTAINABILITY (INCLUDING FINANCIAL SUSTAINABILITY):**

Income-generating productive uses of MHP are PURE's sustainability foundation. MHP will be developed in the Chitral region, where a recent socio-economic study has identified value added products and quantified corresponding income generation<sup>8</sup>. Additional income generated at the local level will allow end users to pay for energy services, thus ensuring sufficient funds for adequate operation and maintenance services, instead of the traditional malpractice in Pakistan of setting tariffs in off-grid systems that do not cover O&M cost, often with detrimental effects for the system's reliability in the long run. The true success of this endeavour will imply that energy will be treated as a means of responding to a productive and social demand, where energy is one of several key inputs such as credit accessibility, technical assistance, market development and administrative processes.

Integrated watershed management at a local level is a component of project sustainability. Rivers and streams are basic in all aspects of rural community livelihoods. Therefore, the use of water as an energy source must be an integral component of watershed management practices. PURE in association with local government and local NGOs will explore methodologies for adequate local or community-level watershed management.

**REPLICABILITY:**

The replicability of the project hinges on PURE's ability to clearly demonstrate the financial and social benefits of MHP-induced productive uses. The project strategy is to develop a win-win model where the income stream, generated through productive uses, provides benefits to both end users and electricity producers in which the end-users have clear commitments and willingness to pay tariffs needed for a long-term maintenance, operation and expansion of the MHP installations. Furthermore, PURE will

<sup>8</sup> See: *Productive Uses of Energy in Chitral District, Pakistan* (GTZ, Eschborn, Germany; May 2005)

focus on developing and facilitating new mechanisms that allow other stakeholders to invest in MHP rather than rely entirely on financing with governmental or donor grants.

These mechanisms will be applicable to Pakistan as a whole, therefore establishing a national framework for project replicability. The Prime Minister has approved a Task Force on the development of mini/micro hydropower, chaired by the Chairman of AEDB, and consisting of the Ministry for Water and Power, Ministry of Environment and UNDP. They have set ambitious targets which fit into the national energy strategy for Pakistan. PURE-Chitral is a pilot project which will be scaled up; AEDB plans to use the success of this project on a national level. The Task Force will be instrumental in replicating the success of this project and would also look into successful experiences of other initiatives nationally and internationally. The local capacity built within project partners will allow the continuation of an integral rural development approach, where energy will not be seen as an end, but as a means to foster economic growth and social services. The participation of grass root groups, agencies, government agencies, authorities at local and district level, provincial government, and private sector will create a critical mass of constituency to support RE and its productive uses. This will enable the continuation of financial and assistance programs based on demand and experience gained during project implementation.

Finally, the replication of project results will be promoted through its active dissemination and lessons learned. PURE will work on information dissemination and public awareness enhancement activities, such as public exhibitions, multi-media presentations, training courses, seminars and workshops.

#### **STAKEHOLDER INVOLVEMENT:**

Typically, mini-grid MHP facilities and productive uses development involve institutional and capacity development support by local governmental, NGOs and locally based organizations. In Chitral District, cooperation will be sought with a number of organisations that are involved in rural development and MHP programmes:

- Aga Khan Rural Support Program (AKRSP): MHP development<sup>9</sup>, vocational and entrepreneurial training, establishing market linkages and marketing of new products, formation of marketing and producer associations<sup>10</sup>.
- Sharhad Rural Support Program (SRSP): drinking water systems, feeder roads in rural areas, construction of MHPs<sup>11</sup>
- Project for Horticulture: assistance to farmers in the product cycle of horticulture, from pre-production to post-marketing
- The Habib Bank, Bank of Khyber, First Micro Finance Bank (FMBF), Small Business Finance Corporation (SBFC) and Agricultural Development Bank of Pakistan (ADBP): provision of commercial credit to meet the working capital requirements of micro and small entrepreneurs, farmers and communities
- The Wood Working Centre (WWC), Government Commerce College, Government Vocational Institute (GVI) and Skills Development Centre (SDC): development of technical skills (carpentry, tailoring, electricians) as well as business skills (accounting).

Apart from the above-mentioned NGOs and financial institutions, other relevant stakeholders include:

---

<sup>9</sup> AKRSP has installed over 180 MHP units (15-75 kW) in Chitral District (that are managed by community organisations), usually with up to 95% subsidy.

<sup>10</sup> AKRSP has recently shifted its credit and savings section into an independent micro-finance institute that provide commercial credit to individuals for meeting their working capital requirements.

<sup>11</sup> SRSP is an NGO that partially follows on the Chitral Area Development Project (CADP), a government multi-sectoral rural development project that was involved in promoting the installation of MHP.

- Current and potential MHP end-users in particular farming households, micro and small entrepreneurs and local services (schools, clinics),
- Grassroots NGOs: village organisations (VOs) and women organisations (WOs) that are present in the five selected areas
- Local governmental institutions: village councils, union councils and division councils.
- Government at provincial (NWFP) and district level (Chitral)<sup>12</sup> and public sector organisations (SHYDO, SRSP, SMEDA, universities)<sup>13</sup>
- Private sector (at district and national level): turbine and generator manufacturers and importers, metal workshops, generator and electric repair workshops
- National-level NGOs, such as the Aga Khan Development Network (AKDN)
- National government ministries and agencies (AEDB, Ministry of Environment, Ministry of Water and Power)
- Other international financing institutions and bilateral development organisations that are active in the area of rural and renewable energy, rural development and natural resources management, such as Asian Development Bank, World Bank, UNDP.

## MONITORING AND EVALUATION:

PURE will be monitored and evaluated according to standard UNDP rules for nationally executed projects. A Project Management Unit (PMU), within a local development agency, under direct responsibility of the Project Manager elaborate and provide key M&E documentation. The PMU is responsible for continuous up-dating and reporting of financial and progress information. Specifically, a quarterly review and reporting cycle will be established with the delivery of financial and progress reports, as well as proposals for updated work plans. The documentation will be subject to approval, potential adjustments and subsequent implementation in the regular meetings held between the A-for-PURE (AEDB) and UNDP. In those meetings, any bottlenecks occurring in implementation will be addressed and resolved. One of the initial activities in the work plan will specify appropriate performance benchmarks, which will be established prior to PURE's implementation to enable effective M&E of project progress, and to create a sound basis for informed crucial management decisions.

PURE's Logical Framework summarizes the indicators of project progress and impact considered appropriate at the present time. It will be further detailed during project initiation. During the 1st quarter of project implementation, the PC will review these indicators with an eye toward fine-tuning them, who will then undertake an assessment of the baseline values for these indicators. These baseline values will then be considered as comparison points for progress being made under the project. In addition, the performance of the MHP systems and development of productive uses will be monitored so that the contribution of PURE can be evaluated in its appropriate context. Adaptive management that responds to changing circumstances in the context of the project will be encouraged, subject to approval by UNDP.

The principle components of the Monitoring and Evaluation Plan will include: (1) a project inception phase, (2) establishing monitoring responsibilities and events, (3) project reporting and (4) independent evaluations.

A Project Inception Workshop will be conducted with the full project team, relevant government counterparts, co-financing partners and UNDP representatives. The fundamental objective of this Inception Workshop will be to assist the project team to understand and take ownership of the project's

<sup>12</sup> Chitral District is divided into two divisions (Chitral and Mastuj), which are subdivided in subdivisions (unions) that are comprised of several villages.

<sup>13</sup> SHYDO: Sarhad Hydel Development Organisation, SRSP: Sarhad Rural Support Programme, SMEDA: Small and Medium Enterprise Development Authority.



goals and objectives, to finalize coordination arrangements with existing initiatives as well as to finalize the preparation of the project's first Annual Work Plan (AWP) on the basis of the project's logic framework (logframe) matrix. This will include reviewing the logframe (indicators, means of verification, assumptions), imparting additional detail as needed, and on the basis of this exercise, finalizing the AWP with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the project. Targets and indicators for subsequent years would be defined annually as part of the internal evaluation and planning processes undertaken by the project team.

A Project Inception Report will be prepared immediately following the Inception Workshop. It will include a detailed Annual Work Plan (AWP) divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. It will also include the project's Monitoring and Evaluation Plan.

Day to day monitoring of implementation progress will be the responsibility of the Project Manager, based on the project's Annual Work plan and its indicators. The Project Management Unit (PMU) will inform the UNDP CO of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion. Quarterly Progress Reports outlining main updates in project progress will be provided quarterly to the local UNDP Country Office (and forwarded to the UNDP-GEF RCU) by the Project Manager.

Periodic monitoring of implementation progress will be undertaken by the Project Steering Committee and UNDP Country Office (CO) through quarterly meetings with AEDB and the PMU (later the "A-for-PURE", when established and functioning) or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the project in a timely fashion to ensure smooth implementation of project activities. The continuous monitoring and evaluation of the project sites, even after completion of the project period, will bring sustainability of the project with desired benefits in the long run.

The Annual Project Report (APR) - Project Implementation Review (PIR) is a self-assessment report by the PMC to the CO, providing inputs to the CO reporting process, as well as forming a key input to the UNDP/GEF M&E Unit, which analyzes the APR-PIRs by focal area, theme and region for common issues/results and lessons. The APR-PIR provides a more in-depth summary of work-in-progress, measuring performance against both implementation and impact indicators.

During the last three months of the project the project team will prepare a Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs, objectives met (or not achieved!) of the Project, as well as lessons learnt and structures and systems implemented. It will also lay out recommendations for any further steps that need to be taken to ensure sustainability and replicability of the Project's activities.

Thematic and Technical Reports will be prepared, as and when called for by UNDP/GEF or PSC. These are detailed documents covering specific areas of analysis or scientific specializations within the overall project. As part of the Inception Report, the project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APR-PIRs. Technical Reports may also be prepared by external consultants. In addition, Project Publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications are informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on the Thematic and Technical Reports or may be summaries or compilations of a series of reports. The results from the project will be disseminated through a number of existing information sharing networks and forums. The project will participate, as relevant and appropriate, in UNDP and GEF sponsored knowledge networks, organized for staff working on activities that share common characteristics. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Identifying and analyzing lessons

learned is an on-going process and communicating such lessons is a requirement to be delivered not less frequently than once every 12 months. UNDP/GEF shall provide a format and assist the project team in categorizing, documenting and reporting on lessons learned. To this end a percentage of project resources will need to be allocated for these activities.

The project will be subjected to at least two independent external evaluations as follows:

An independent Mid-Term Evaluation will be undertaken 18 months after project initiation. 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 organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties/ The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO, based on guidance from the UNDP-GEF RCU.

An independent Final Evaluation will take place three months prior to the project's termination date and will focus on the same issues as the mid-term evaluation and, in addition, will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO, based on guidance from the UNDP-GEF RCU.

AEDB will provide the UNDP 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 UNDP User Guide. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government of Pakistan.

## **FINANCING (FINANCING PLAN, COST EFFECTIVENESS, CO-FINANCING, CO-FINANCIERS):**

### **FINANCIAL PLAN:**

PURE is expected to cost US\$ 19,231,000 of which US\$ 950,000 will be requested from GEF. The GEF contribution will be used to address the various barriers that hamper the development of off-grid mini/micro hydropower.

### **COST EFFECTIVENESS:**

The GEF contribution represents a leverage of 1 to 4.7 approximately. The fact that the Government of Pakistan has pledged significant resources towards the incremental cost of the project demonstrates full ownership of the project, commitment to trigger the application of off-grid renewable energy technologies for productive uses. In addition, further contributions are expected from the NGOs, private sectors and local communities.

## **Technical Assistance Consultancy Budget**

### **a) Local Consultants**

93 staff weeks are estimated for local consultants providing technical inputs. Most of these will be short term consultancies in the range of around USD 250-300/day resulting in a staff week cost of around USD 1,500.

**b) International Consultants**

7 staff weeks are estimated for international consultants providing technical inputs. Most of these will be short term consultancies at a rate of USD 600/day resulting in a staff week cost of around USD 3,000. However, the international consultants will only be engaged if national experts are not available to conduct the specific activity. In case, the US\$ 20,000 are not used, these would be diverted to other activities during project implementation.

**Description of Major Consultancies:**

<b>Consultancy Description</b>		<b>Estimated Cost (GEF contribution)</b>
Project Management	A team of professionals and support consultants will manage the project. The team will be led by the Project Manager and comprise of three field managers, one social scientist, two office/ admin assistants and three drivers. The project manager would be responsible to lead and guide the project team, contract out and supervise all technical consultancies, administrative and financial management, liaison with UNDP office and so on. Combined, 400 person months are allocated for the 4 year project. The total budget for this team is USD 368,800, which is about 8 percent of the project budget.	\$190,000
Development of 15 MW of MHP schemes	An international consultant will be contracted for approx. 20 weeks with intermittent inputs over the 4 year period. This consultant would support the project team with regard to: Design of MHP; Institutionalizing a training program for local technical personnel, end users and other stakeholders in 2 to 3 key teaching institutions in Chitral, Pakistan; Establishing indicators to monitor MHP installations; Establish standard specifications for MHP and spot checks during installations.	\$545,000
Development of productive uses of energy model.	A local and an international consultant will be contracted for approx. 25 weeks (20 weeks for the national and 5 weeks for the international consultant) over the 4 year period. These consultants would support the project team with regard to: Elaborate on PUE options specifically for rural conditions such as in different areas of Chitral District, together with a draft support program to facilitate implementation;	\$254,000
Capacity Strengthening	A local and an international consultant will be contracted for approx. 25 weeks (10 weeks for the national and 15 weeks for the international consultant) over the 4 year period. These consultants would support the project team with regard to: Establishment of enabling environment in MHP watersheds; Providing basis for the establishment of A- for PURE in Chitral; and, capacity strengthening on MHP and PUE at district level.	\$95,000
Establishment of replication models.	A local and an international consultant will be contracted for approx. 40 weeks (25 weeks for the national and 15 weeks for the international consultant) over the 4 year period. These consultants would support the project team with regard to: Capacity strengthening of private entities, NGOs and govt on for MHP; Policy dialogue on PUE; and proposed strategy for electrification in rural areas.	\$110,000
Monitoring, Learning, and Feedback.	Approx. four local and international consultants will be contracted for 6 weeks (3 weeks for national and 3 weeks for international consultants) over the 4 year period. These consultants would support the project team with regard to: conducting the mid-term and final evaluations (2 consultants each, one national and one international); exposure visits to project sites; an annual experience sharing workshop featuring all stake holders; video documentation; presentations on project achievements in various forums and other tasks as relevant to this component.	\$81,000

## **INSTITUTIONAL COORDINATION AND SUPPORT**

### **A) CORE COMMITMENTS AND LINKAGES**

Pakistan's UNDP Country Office (CO) is fully committed to assist Pakistan in facilitating access to sustainable energy services to rural poor and has a portfolio of climate change and environmental projects, including GEF-supported Enabling Activities, Full and Medium-Sized projects, including the Utility-scale Wind Power Production project and Fuel Efficiency in the Road Transport project. A close partnership has developed between UNDP Pakistan and the Ministry of Environment in implementing these projects.

The proposed project is fully compatible with UNDP's mandate in assisting developing countries in reaching the Millennium Development Goals, particularly the MDG-7 (environmental sustainability) and MDG-8 (partnerships for development).

### **B) CONSULTATION, COORDINATION AND COLLABORATION BETWEEN IAS, AND IAS AND ExAs, IF APPROPRIATE.**

The World Bank is working in collaboration with Pakistan Poverty Alleviation Fund to establish the micro hydel sites in the Northern part of Pakistan. The partners with this initiative are Aga Khan Rural Support Programme and local community organizations.

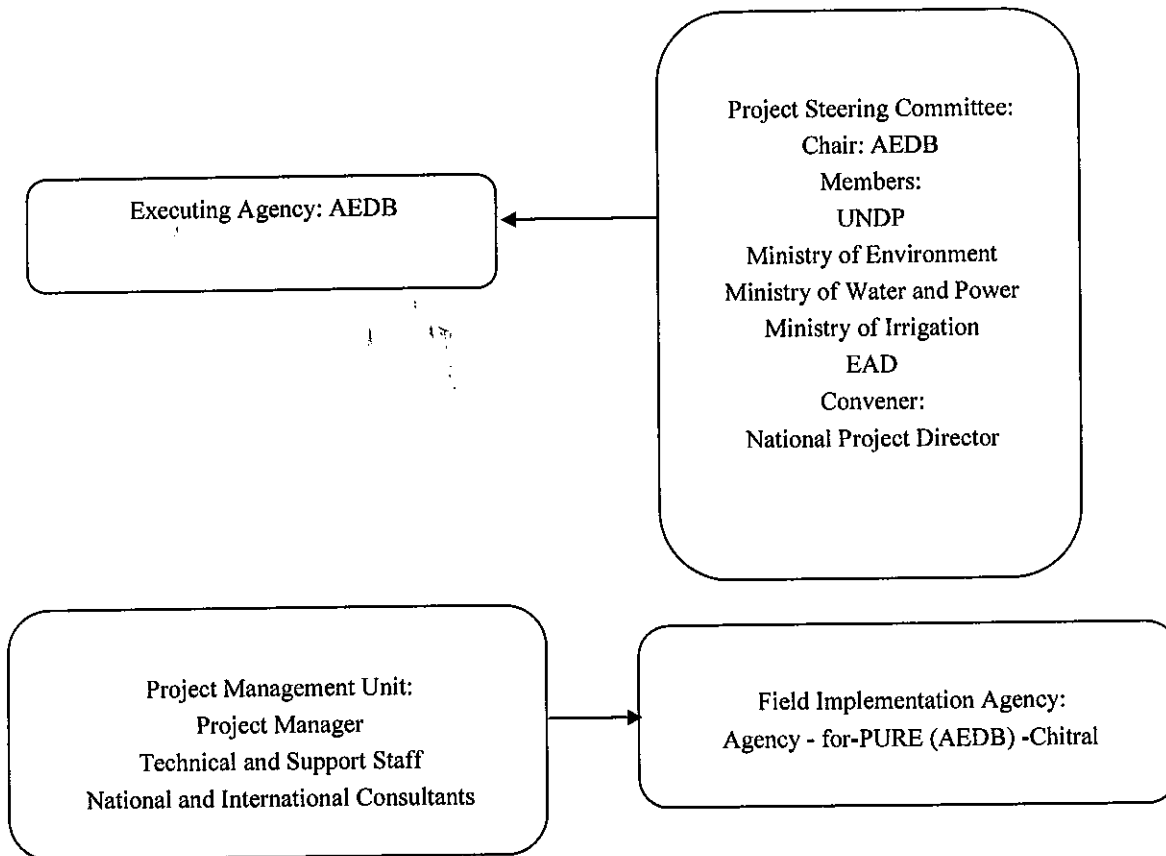
N/A

### **C) PROJECT IMPLEMENTATION ARRANGEMENT**

The project will be implemented by UNDP and executed by the Alternative Energy Development Board (AEDB). A *Project Steering Committee* (PSC) will be established in which will be present UNDP, AEDB, Ministry of Environment, Ministry of Irrigation and Ministry of Water and Power. The PSC will provide guidance and supervision on the project implementation. Essentially, all participating entities in project co-financing and implementation will be invited to participate in its regular monthly meetings, convened by the National Project Director, to oversee the smooth running and effective execution of programmatic activities and budgets and to allow for strategic planning, adaptive management and logistical coordination to take place. In this context, the project will also coordinate closely with other donor projects operating in the region that work in the area of renewable energy, natural resources management and/or livelihood improvement.

In Chitral District, an implementation structure will have to be established or an already established local development organization will be supported to play this role. This agency, referred to as A-for-PURE (Agency for Productive Uses of Renewable Energy) will be responsible for planning, design, supervision of MHP (and other renewable energy technologies) at selected sites, assessment of potential productive uses, involvement of village organisations in local management, business services (information, training, marketing support) as well as monitoring and evaluation activities, in cooperation with authorities, donors, NGOs and service providers. Legally, A-for-PURE will be a NGO or private ('not-for-profit' company) with stakeholders of concerned government offices, NGOs and private sector. Until the time that the A-for-PURE is established and has sufficient critical mass and capacity built to assume the above-mentioned tasks, AEDB will act in this capacity.

A *Project Management Unit (PMU)*, headed by a *Project Manager*, will be responsible for formulating and submission of work and financial plans top the PSC, monitoring of work progress, coordination with the various national and local government ministries and agencies and other project cooperation partners, ensuring the timely provision of inputs to the PSC, providing guidance to the project team of national and international consultants, coordinating issues with UNDP and AEDB, reviewing reports and to look after administrative arrangements required under UNDP procedures.



AGA KHAN RURAL SUPPORT PROGRAMME

آغا خان رورل سپورٹ پروگرام

Dated: May 13, 2009

TO: Dr. Basharat Hassan Bashir  
DG Bio Mass and Hydropower  
AEDB Office Islamabad

Subject: Funding Commitments in our CDCF Project

Dear Sir,

Financial commitments have been made by different stakeholders to support the Community Development Carbon Finance-CDCF project of AKRSP in Northern Areas and Chitral. The status of commitments as according to the financial model and the Project Design document is as following;

Pakistan Poverty Alleviation Fund-PPAF	US\$ 6,000,000
Pakistan Council of Renewable Energy Technologies-PCRET	US\$ 3,330,000
Acumen Fund (Participate both as Equity and Loan)	US\$ 5,420,000
Community Participation (Labor and Local Material)	US\$ 3,206,000

So far the cash flow to our CDCF project is satisfactory and it is anticipated that AKRSP will not face a cash flow problem during construction phase of this project. If you need further clarification to the above statement, please feel free to contact me.

With best wishes,



(Sher Khan)

PM Infrastructure

Islamabad