Final Report

Pro-poor Smart Subsidy Mechanism with Adjustment/Extension in the Existing Subsidy Policy and Sustainable Institutional Mechanism

Submitted to:

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Acronym

ADB/N	Agriculture Development Bank of Nepal
AEPC	Alternative Energy Promotion Centre
Av	Average
CBO	Community Based Organization
DDC	District Development Committee
DEF	District Energy Fund
ESAP.	Energy Sector Assistance Programme
ha	Hactare
HH	Household
KW	Kilo Watt
LB	Local Body
MHP	Micro-hydro Plant
MoLD	Ministry of Local Development
MW	Mega Watt
NEA	Nepal Electricity Authority
PAR	Prior Appropriation Right
Pvt.	Private
REDP	Rural Energy Development Programme
RETs	Rural Energy Technologies
SAPAP	South Asia Poverty Alleviation Programme
SAPPROS Nepal	Support Activities for Poor Producers of Nepal
SHS	Solar Home System
TRC	Technical Review Committe
UMN	United Mission to Nepal
UNDP	United Nation's Development Programme
VDC	Village Development Committee

Pro-poor Smart Subsidy Mechanism with Adjustment/Extension in the Existing Subsidy Policy and Sustainable Institutional Mechanism

1. BACKGROUND

1.1 Introduction

Energy is one of the major input for development which opens several vistas of opportunities. When this happens to be clean renewable one, the benefits are multiplied. In many developing countries including Nepal, bulk of the clean energy is furnished to the urban areas leaving rural areas in darkness. This, in most part, explains the difference between the rural and the urban areas in countries like Nepal where there is a huge rural area virtually devoid of electric power and small urban sector enjoying full modernity. This duality in opportunity is what ignites the rift and conflict in a country which Nepal has witnessed with great pain. Real and lasting peace in the country can only come when there is more or less equitable access to various services including energy services to the habitants of both urban and rural areas.

In recognition of this reality, the Government of Nepal devised policies and created institutions for rural energization. The institutions like Alternative Energy Promotion Centre (AEPC), Rural Energy Development Program (REDP) and others have evolved to expedite rural energization with necessary support. However, even with these institutions, the current energy deficit in the rural areas is huge as only less than 15 percent of the rural areas have access to clean energy. In the last over a decade, only about 15 MW equivalent of renewable energy outfit has been added through these institutions in the rural areas. There is, therefore, a clear under-investment in rural energy source development in Nepal.

Further, energy can be a prudent source for poverty reduction if this can be targeted to the rural poor and socially excluded. Again for a number of reasons, such targeting has not been possible to the extent desired. The problem is that the rural poor have to muster at least a part of investment cost over and above what the government provides as subsidy as against the urban consumers who pay power tariff only after the product has been used. Moreover, such equity contribution on investment is declining over time. In such a situation, the government subsidy is likely to land up in the relatively well-to-do communities. So, the real issue is how to enhance investment in the rural power sector and how to divert such investment for the upliftment of the poor and the socially excluded. In this context, there may be a need to make modification in the existing subsidy policy to enhance right of entry to rural poor and more remote areas including women, the poor, and socially excluded groups. To include very poor and socially excluded group subsidy policy has to incorporate pro-poor smart subsidy mechanism and to propose amendment in the existing subsidy policy and sustainable institutional mechanism.

It is with this concern that REDP has awarded this study to SAPPROS-Nepal to come up with the reformed subsidy policy and the institutional mechanism to deliver such subsidy in a way which improves the living conditions of the poor rural population by enhancing their access to, and the affordability of, rural energy solutions that are environment-friendly and that address social justice problems in a sustainable manner. The sustainability of energy systems in a growing rural electrification system and energy uses needs to be ensured through larger and inter-connected systems.

2. OBJECTIVE

The main objective of the study is to advise a pro-poor smart subsidy mechanism with adjustment/extension in the existing subsidy policy with reliable and sustainable institutional instrument.

3. METHODOLOGY

3.1 Review of Related Materials

The study began with the review of the existing subsidy mechanism and guidelines, collecting information, evaluating the outputs of existing subsidy mechanism, outcomes and results and assessing the lessons learned. Major documents reviewed included the AEPC/REDP documentations made in the earlier phases such as subsidy mechanism (2000, 2006, 2008), project reports, advancement reports, and other pro-poor subsidy related guidelines and publications. The strategies, approaches and institutional arrangement followed for the implementation of the pro-poor subsidy delivery mechanism was also thoroughly reviewed.

3.2 Conduct Workshop

The study team conducted a two-hour consultative workshop prior to the field study inviting related stakeholders such as REDP, AEPC, UNDP and others. The workshop focused on the following themes:

- Limitation of exiting subsidy policy for delivery to poor and socially excluded groups.
- Necessary modification in existing mechanism and suggestion of consistent delivery mechanism.
- Best practices in pro-poor growth and subsidy in rural globe.
- Adjustment/Extension in institutional arrangement and to recommend sustainable institutional instrument.

3.3 Prepare Checklist

A checklist was prepared for the local bodies (DDC, VDC and the potential and actual beneficiaries and other related institutions) to solicit the required information and is presented in Annex-1. The checklist sought information on the existing subsidy mechanism, the delivery mechanism and the problems and limitations of the existing arrangements. The idea is to evolve a better mechanism that will be reliable and sustainable. The differential subsidy mechanism in favour of the rural poor was also explored.

3.4 Field Visit

The objectives of the field visit were to:

a. Bring together information, experiences, outcomes, lesson learned and data on the project activities, problems and impacts made at all levels - community, district and center.

b. Analyse the findings to evaluate the major limitations and problem encountered during delivery to poor and socially excluded groups.

c. Explore reasons behind exclusion in existing subsidy policy for poor and socially excluded group.

The study team visited two districts – Kavre and Sindhuli to solicit opinions of various stakeholders (local bodies, actual and potential beneficiaries) on the issue of pro-poor subsidy and the associated institutional delivery mechanism. In Kavre, Pinthali village of Mangaltar VDC was covered where a 8 KW micro-hydro system was completed in 1999 which is still functioning properly. In Sindhuli, Kusheshwar Dumja VDC was covered as a potential site for new micro-hydro development from the water of Roshi khola.

An interaction with LDO of Kavre about the subsidy and institutional delivery mechanism of REDP.

A field visit to Daune Khola Micro Hydro Project (12 Kw) in Pinthali, Mangaltar VDC of Kavre district.

3.5 Prepare Report

The study findings were synthesized into a draft report in line with the present model of REDP and the guiding principle provided by the United Nations Development Programme. This draft report was presented to REDP and its supporting organizations (MoLD, UNDP, World Bank) with key alteration, issues and recommendations to the REDP, AEPC and UNDP for sustainable pro-poor subsidy delivery mechanism. The report has been be finalized incorporating the comments and suggestions of the REDP and key stakeholders. The new model is labeled as the REDP/AEPC plus model.

A discussion held with community and users of Daune Khola Micro Hydro Project.

4. SITUATION ANALYSIS ON RETS

4.1 Trend in Subsidies for RETs

The existing subsidy rates for different rural energy technologies were first promulgated since 2000 with upward adjustments made in 2006 and in 2008. With each new adjustments made, the earlier Subsidy Arrangements were scraped. The subsidy rates in 2006 and that modified recently in 2008 are compiled and presented in Table 1 for each rural energy technology.

Table 1: Subsidy Rate Provisions (2006 and 2008)

RETs	Unit range	2006	2008
New Micro-Hydro Projects	Up to 5 KW	Rs.8,000/HH but not exceeding Rs.65,000 per KW	Rs.12,000/HH but not exceeding Rs.97,500 per KW
	>5-500 KW	Up to Rs.10,000 per/HH but not exceeding Rs.85,000 per KW	Up to Rs.15,000 per/HH but not exceeding Rs.125,000 per KW
MHP Rehabilitation		Up to Rs.10,000 per incremental HH but not exceeding Rs.85,000 per KW	Up to Rs.15,000 per incremental HH but not exceeding Rs.125,000 per KW
Improved Water Mill	Up to 5 KW	Up to Rs.6,000 per HH but not exceeding Rs.60,000 per KW	
Transport Subsidy for MHP	All systems of different capacity ranges	Rs.3,000 per HH in Category A VDCs (more than 50 km from nearest road head; Rs.1,200 per HH in Category B VDCs (25-50 Km from nearest road head; and no subsidy for less than 25 km from road head (Category C VDCs)	Rs.500 per km per KW but not exceeding Rs.30,000 per KW of installed capacity
	All districts listed in foot note		Rs. 30,000 per KW for new and 50% for rehab schemes
Solar home system (SHS)	10-18 wP	Rs.7,000 for category A VDCs; Rs.6,000 for category B VDCs and Rs.5,000 for category C VDCs	Rs.7,000 for category A VDCs; Rs.6,000 for category B VDCs and Rs.5,000 for category C VDCs
	> 18 wP	Rs.10,000 for category A districts; Rs.8,000 for category B districts and Rs.6,000 for category C districts	Rs.10,000 for category A districts; Rs.8,000 for category B districts and Rs.6,000 for category C districts
Public SHS	All capacity ranges	75% of the cost	75 percent of the cost but not exceeding Rs.15,000 per system
Solar tuki	2-8 wP solar panel along with two sets of solar lamp	50 percent of the cost but not exceeding Rs.1,250 per system	
	5 wP solar panel along with two sets of solar lamp		Rs.2,000 per system
Solar cooker	All capacity ranges	50 percent of the cost but not exceeding Rs.4,000 per system	50 percent of the cost but not exceeding Rs.5,000 per system
Solar dryer	Household - All capacity ranges	50 percent of the cost but not exceeding Rs.20,000 per system	50 percent of the cost but not exceeding Rs.20,000 per system
	Commercial - All capacity ranges		70% of the cost

RETs	Unit range	2006	2008
Solar water pump	Up to 1,000 wP	75 percent of the cost	
	Up to 1,500 wP		75% of the cost but not exceeding Rs. One million
Biogas	20 districts of Tarai GGC 2047 model of 4-10 cu.m capacity	Rs.6,000 per plant	
	40 hill districts	Rs.9,000 per plant	
	15 mountain districts	Rs.12,000 per plant	
	Specified districts with low penetration	Additional Rs.500 per plant	
	Small users (4-6 cu.m.)	Additional Rs.500 per plant	
Improved water mill	For grinding	Rs.9,000 per system in specified districts	
	For hulling and grinding	Rs.18,000 per system in specified districts	
Improved cook stove (ICS)	high mountains for cooking and space heating	50 percent of the cost but not exceeding Rs.2,500 per system	
Mud cook stove		No subsidy in the hills and mountains	
Wind energy systems		Same as SHS per household	

When subsidy mechanism began in 2000, the rates were more closer to the actual cost of the system thus requiring the rural population to contribute lesser cash and labour for system establishment. Over time, the cost of system establishment rose considerably while it took nearly 6 years to revise the subsidy rates. Since the revision was only modest (less than 20 percent as against the cost inflation of nearly 50 percent), the equity contribution burden was increased. The 2008 revision, particularly on micro-hydro schemes, was substantial (50%) with toppings for the poor and remote areas but still is less in percentage terms compared to the subsidy levels in 2000.

The implication of this decline in subsidy is analysed in terms of demand for the rural energy technologies in the following section.

4.2 Trend on RET Establishment

Data on RET establishment were obtained from AEPC for the year up to 2007, particularly for the hydro systems, which has been presented in Table 2. The data shows that there has been positive annual growth rate in both the number and capacity (KW) of the hydro systems over the years if the whole range from 1986 to 2007 is considered. However, from 1998 onwards, when the subsidy began, the growth trend is declining and is even negative for the pico hydro systems. Although there may be several factors governing the declining growth trend, it may as well be the consequence of subsidy decline, at least to some extent.

Table 2: Trend on Establishment of RETs up to 2007

Year	Hydro								
	Pico			Micro			Total		
	No.	KW	Av. KW	No.	KW	Av. KW	No.	KW	Av. KW
Up to 1985	0	0		75	686	9.15	75	686	9.15
1986	0	0		20	204	10.20	20	204	10.20
1987	0	0		17	191	11.24	17	191	11.24
1988	0	0		11	110	9.98	11	110	9.98
1989	0	0		17	183	10.76	17	183	10.76
1990	0	0		11	98	8.91	11	98	8.91
1991	46	43	0.93	7	125	17.86	53	168	3.17
1992	13	12	0.92	6	107	17.83	19	119	6.26
1993	0	0		3	27	9.00	3	27	9.00
1994	79	100.3	1.27	5	126	25.20	84	226	2.69
1995	115	170	1.48	13	145	11.15	128	315	2.46
1996	130	203	1.56	14	174	12.43	144	377	2.62
1997	84	143	1.70	16	263	16.44	100	406	4.06
1998	97	185	1.91	28	431	15.39	125	616	4.93
1999	123	226	1.84	25	387	15.48	148	613	4.14
2000	112	213	1.90	40	720	18.00	152	933	6.14
2001	36	81	2.25	50	891	17.82	86	972	11.30
2002	61	141	2.31	34	365	10.74	95	506	5.33
2003	80	184	2.30	53	750	14.15	133	934	7.02
2004	66	141	2.14	35	421	12.03	101	562	5.56
2005	48	101	2.10	38	662	17.42	86	763	8.87
2006	46	101	2.20	42	893	21.26	88	994	11.30
2007	70	202	2.89	98	1879	19.17	168	2081	12.39
Slope 1986-2006	**4.0**	**9.1**	**0.1**	**1.9**	**35.4**	**0.3**	**5.9**	**44.5**	**-0.1**
Slope 1998-2006	**-8.0**	**-12.5**	**0.0**	**1.5**	**32.2**	**0.2**	**-6.5**	**19.7**	**0.6**

Source: Compiled from Mini-Grid Yearbook of Nepal, 2007. AEPC/ESAP.

Table 3: Trend Establishment of Turbine mills and improved water mills up to 2007

Year	Hydro					
	Turbine Mills			IWM		
	No.	KW	Av. KW	No.	KW	Av. KW
Up to 1985	402	3464	8.62			
1986	71	571	8.04			
1987	75	710	9.47			
1988	51	430	8.43			
1989	37	288	7.78			
1990	32	260	8.13			
1991	42	415	9.88			
1992	25	261	10.44			
1993	13	146	11.23			

Year	Hydro					
	Turbine Mills			IWM		
	No.	KW	Av. KW	No.	KW	Av. KW
1994	21	237	11.29			
1995	12	141	11.75			
1996	9	81	9.00	40	49	1.23
1997	5	35	7.00	18	21	1.17
1998	2	14	7.00	94	96	1.02
1999	2	13	6.50	124	NA	
2000	0	0		91	NA	
2001	1	10	10.00	107	NA	
2002	0	0		58	NA	
2003	7	53	7.57	65	NA	
2004	3	21	7.00	538	NA	
2005	6	47	7.83	599	NA	
2006	3	11	3.67	843	NA	
2007	5	50	10.00	625	805	1.29
Slope 1986-2006	**-3.2**	**-28.7**	**-0.1**	**68.4**	**23.5**	**-0.1**
Slope 1998-2006	**0.5**	**2.9**	**-0.2**	**87.9**		

Source: Compiled from Mini-Grid Yearbook of Nepal, 2007. AEPC/ESAP.

Table 4: SHS Establishment by District, As of December 2006

District	up to 2006	2004/05	2005/06	2006/07	Slope
Achham	427	167	16	104	-32
Arghakhanchi	2,438	249	29	89	-80
Baglung	2,948	339	23	43	-148
Baitadi	486	13	1	62	25
Bajhang	1,823	539	354	228	-156
Bajura	255	114	6	28	-43
Banke	105	39	11	0	-20
Bara	33	10	1	1	-5
Bardiya	478	113	47	23	-45
Bhaktapur	-	0	0	0	0
Bhojpur	1,770	210	64	85	-63
Chitwan	1,919	220	450	216	-2
Dandeldhura	89	10	0	3	-4
Dailekh	264	8	2	102	47
Dang	81	20	2	9	-6
Darchula	3,087	690	214	134	-278
Dhading	2,124	179	158	169	-5
Dhankuta	780	63	35	27	-18
Dhanusha	67	7	0	0	-4
Dolakha	1,253	258	90	127	-66
Dolpa	2,967	703	162	191	-256
Doti	90	16	0	2	-7
Gorkha	2,503	295	65	136	-80
Gulmi	4,813	624	128	95	-265
Humla	939	108	146	46	-31
Ilam	1,946	316	111	119	-99

District	up to 2006	2004/05	2005/06	2006/07	Slope
Jajarkot	973	270	198	102	-84
Jhapa	46	1218	0	0	-609
Jumla	2,952	0	717	223	112
Kavre	1,621	55	8	31	-12
Kailali	2,346	358	134	87	-136
Kalikot	447	114	72	102	-6
Kanchanpur	491	64	63	42	-11
Kapilvastu	64	12	0	0	-6
Kaski	1,003	135	12	15	-60
Kathmandu	77	0	0	0	0
Khotang	2,955	323	56	83	-120
Lalitpur	201	9	0	2	-4
Lamjung	3,507	824	198	222	-301
Mahottari	110	11	0	0	-6
Makwanpur	1,680	453	34	89	-182
Manang	91	2	0	0	-1
Morang	322	17	18	4	-7
Mugu	1,450	271	302	119	-76
Mustang	648	304	73	16	-144
Myagdi	1,734	89	38	16	-37
Nawalparasi	757	243	53	66	-89
Nuwakot	284	21	1	16	-3
Okhaldhunga	1,428	191	26	64	-64
Palpa	2,077	270	84	160	-55
Panchthar	2,668	236	57	106	-65
Parbat	2,168	175	59	45	-65
Parsa	312	108	34	15	-47
Pyuthan	495	157	15	54	-52
Ramechhap	1,128	52	42	61	5
Rasuwa	759	192	120	15	-89
Rautahat	183	81	1	12	-35
Rolpa	4,896	1997	630	1264	-367
Rukum	3,276	1713	167	575	-569
Rupandehi	16	7	0	0	-4
Salyan	360	145	53	72	-37
Sankhuwasabha	3,306	622	291	93	-265
Saptari	107	0	0	0	0
Sarlahi	552	39	0	5	-17
Sindhuli	1,681	333	159	343	5
Sindhupalchok	735	95	10	23	-36
Siraha	55	0	0	0	0
Solukhumbu	1,465	189	67	17	-86
Sunsari	15	0	0	0	0
Surkhet	134	5	20	34	15
Syangja	2,272	394	159	121	-137
Tanahu	3,434	411	268	180	-116
Taplejung	2,118	139	25	64	-38
Terhathum	908	82	4	9	-37
Udayapur	1,162	151	205	90	-31
Unspecified	1,521	0	0	0	0
TOTAL	96,675	17,887	6,588	6,696	-5596

A total 0f 96,675 SHS units had been established as of the end of December 2006. Solar Home Systems (SHS) showed a declining trend since 2004/05. Only few districts (5) witnessed a marginally increasing trend. SHS schemes have covered nearly 50 percent of the total VDCs of the country.

Table 5: Solar PVC Establishment as of December 2006

Solar PVC		
District	No.	Wp
Achham		
Arghakhanchi		
Baglung		
Baitadi		
Bajhang		
Bajura		
Banke		
Bara		
Bardiya		
Bhaktapur	1	40000
Bhojpur	2	900
Chitwan	1	1480
Dandeldhura		
Dailekh		
Dang	1	1480
Darchula	4	1170
Dhading	19	16442
Dhankuta		
Dhanusha		
Dolakha		
Dolpa		
Doti		
Gorkha	2	624
Gulmi		
Humla		
Ilam		
Jajarkot		
Jhapa	1	430
Jumla		
Kavre		
Kailali		
Kalikot		
Kanchanpur		
Kapilvastu		
Kaski		
Kathmandu	2	5050
Khotang		
Lalitpur		
Lamjung		
Mahottari		
Makwanpur		1
Manang		
Morang	1	1600
Mugu		
Mustang	1	1600
Myagdi		
Nawalparasi	1	1600
Nuwakot		
Okhaldhunga	3	1440
Palpa	1	480
Panchthar	1	800
Parbat		
Parsa		
Pyuthan	3	2418
Ramechhap		
Rasuwa		
Rautahat		
Rolpa		
Rukum		
Rupandehi		
Salyan		
Sankhuwasabha		
Saptari		
Sarlahi	4	5700
Sindhuli		
Sindhupalchok		
Siraha		
Solukhumbu		
Sunsari		
Surkhet	1	1600
Syangja	3	6200
Tanahu	11	24565
Taplejung		
Terhathum		
Udayapur		
Unspecified		
TOTAL	**63**	**115,580**

At the household level, a total of 63 solar PV systems were established as of December 2006 with a total capacity of 115,580 Wp.

Table 6: Number of Biogas Established, 2002/03 to 2006/07

FY	Biogas
2002/03	8,691
2003/04	6,242
2004/05	9,689
2005/06	9,066
2006/07	9,731
Total	43,419
Slope	490

Between FY 2002/03 to FY 2006/07, a total of 43,419 biogas units were established at the household and community levels at an average of 8,864 units per year. Biogas establishment increased by 490 units per year from FY 2002/03 to 2006/07.

Such decline is more clearly revealed from REDP data which is presented in Table 4. In this case, the decline is faster except in the case of solar PV systems.

Table 7: Trend in RET Establishment, REDP, 1998-2006

Year	MH/Peltric			Solar PV	Biogas	ICS
	No.	KW	HH			
1998	**12**	**123**	**1,040**	**-**	**15**	**290**
1999	19	292	2,512	137	29	1,385
2000	16	266	2,419	766	381	2,473
2001	29	433	4,118	121	859	1,513
2002	25	199	2,080	109	1,339	1,295
2003	28	325	3,256	79	686	2,109
2004	14	138	1,380	121	62	584
2005	13	191	1,986	251	304	1,052
2006	17	293	2,833	158	326	1,461
TOTAL	**173**	**2,259**	**21,624**	**1,742**	**4,001**	**12,162**
Slope (1998-2006)	**(0.8)**	**(13.4)**	**(82.8)**	**(29.3)**	**(16.1)**	**(101.7)**
Slope (2001-2006)	**(3.1)**	**(25.9)**	**(245.2)**	**18.7**	**(182.7)**	**(71.8)**

Source: REDP Progress Reports, 1998-2006.

4.3 Results and Analyses from District Questionnaire Survey

As shown in the methodology section, the chiefs of the district chapters of REDP were surveyed with the help of questionnaire sent to them (Annex 2). A total of 9 responses were received from 9 districts (Panchthar, Okhaldhunga, Solukhumbu, Sindhupalchok, Kavre, Jajarkot, Doti, Darchula and one unspecified). The responses were generally not complete mainly with regard to the subjective questions. Nevertheless, the available responses are compiled and analysed to draw some useful conclusions. The compiled responses are shown in Table 1 and Annexes 3 to 7.

Adequacy of Existing Subsidy Levels on RETs

A total of two-third of the respondents said that the existing subsidy rates were not adequate as these rates had reached the levels which were much less in percentage terms than in the past. Another one-third respondents, mainly from the west, considered these to be adequate. However, the latter also revealed that it has been increasingly difficult to reach the remote and poor areas which reflects the inadequacy of the subsidy requiring higher levels of equity contribution which the poor households and communities find it difficult to muster. Three respondents also suggested the desired minimum level of subsidy, the average of which was 60 percent. Few responses indicated that the subsidy rates should be fixed in percentage terms rather than in absolute amount terms so that the rates will automatically adjust in par with the cost inflation.

Efficiency and Timeliness of Existing Subsidy Delivery Arrangements

Majority of the respondents (78%) reported the existing subsidy delivery arrangements through the District Energy Funds (DEFs) to be efficient and timely. Delayed deliveries were reported only in two cases.

Optimality of Current Subsidy Determination Basis

Over 60 percent respondents considered the basis for subsidy level determination to be acceptable. The subsidy levels were initially determined on the basis of cost and were reviewed occasionally when the systems costs had gone up. Three respondents, however, did not consider the basis to be satisfactory. They opined that there should have been more subsidy for the poor so that they could be reached as per the mandate of REDP more easily.

Reaching the Poor and the Socially Excluded

Majority of the respondents (78%) voted in favour of having differentiated subsidy for the poor (more subsidy for the poorer). The respondents in this category included even those who had considered the existing basis for subsidy determination to be optimal. This shows that there were some inconsistent responses to the given questions. The reason given for supporting the differentiated subsidy was because it had been difficult over time to reach the poor and the socially excluded.

Who is Subsidizing Whom?

Asked whether the non-poor households in the command area of the systems were helping the poor to participate, about 30 percent replied in affirmative. In some systems, the non-poor households were contributing their lands for collateral against the borrowings from the Banks to fulfill the equity contribution requirements. They were also helping the poor to work more in the system so that the cash contribution requirement will be lesser. However, majority of the respondents expressed that such help to the poor were exceptions rather than the rule.

Has the RETs Gone to Poor and Remote Areas?

All respondents were unanimous in claiming that the newer RET systems have not gone to the remote and poor areas of the district. Two third respondents claimed that the poor were excluded even within the command areas of the completed as well as the approved systems.

RET Cost Comparisons a Decade Ago and Now

A total of 6 respondents made a crude estimate of the costs of establishment of micro hydro system on per KW basis 10 years ago and now. The compilation of these results is shown in Table 5. According to the Table, average cost per KW 10 years ago worked out to Rs.108,631 which increased to Rs.197,963 now, registering an increase of 64 percent in 10 years. A decomposition of the cost between material and labour showed1 percent and 77.2 percent increase respectively.

Table 8: Cost of RETs Now and 10 Years' Ago as Reported by REDP District Officials

MHP cost per KW 10 years ago	Average	Variance
Material	114305	1403
Labour	25363	234
Total	139668	5188
MHP cost per KW now		
Material	183994	979

Labour	44958	466
Total	228952	6562
Unskilled wage rate 10 years ago	111	2832
Unskilled wage rate now	193	2235
Increase in MH cost Total (%)	64	26
Material	61	-30
Labour	77	99
Labour wage rate increase (%)	75	-21

Source: Questionnaire filled by REDP district officials, 2009

The respondent estimates are crude and appear to be rather conservative for the current estimates, particularly on the material side. The average inflation level in the last 10 years as reported by the Government of Nepal is 7.7 percent which doubles the cost in 10 years. More recently, this has been escalated to as high as 12.5 percent At this cost inflation, the cost is doubled in less than 6 years. The metal prices have increased at considerably more than the average inflation rate and hence the material costs should have increased by more than 100 percent in the last 10 years.

5. CURRENT ISSUES

5.1 Incongruent Subsidy Rates

Table 1 on RET subsidy rates reveal that there is no consistent or congruent framework in the fixation of the subsidy rates. In some RETs, the rates are fixed on the amount basis while in others these are fixed on percentage basis. When subsidy rates on fixed on amount basis and when these are not amended frequently, the rates decline over time due to cost inflation factor. This framework has not been corrected even in the subsidy rate revisions made in 2006 and in 2008. When subsidy rates are fixed on percentage basis, these automatically take care of the inflation factor.

5.2 Declining Subsidy Trend

The major issue with regard to the current study is the declining level of subsidy over time. For example, about 10 years ago, the cost of development of 1 KW equivalent of power from micro-hydro ranged from Rs.100,000 to Rs.120,000 with an average of Rs.110,000. The subsidy per KW at that time was Rs.70,000. With this, the subsidy rate at that time worked out to nearly 64 percent. Over time, the prices of RET related raw materials have sky-rocketed at rates more than the government declared normal average inflation rate of 7.7 percent in the last 10 years[1]. The production cost of 1 KW power from micro-hydro is estimated at Rs.250,000 to Rs.300,000 with an average of Rs.275,000 at 2008 prices. The subsidy level currently stands at Rs.125,000 per KW. With this, the current subsidy rate works out to only about 45 percent, which is less than much below the rate that prevailed 10 years ago. With the subsidy rate of 2006, this is even lower (31%).

5.3 Consequences of Declining Subsidy

5.3.1 On System Demand

The consequence of this declining subsidy has been that the trend of RET development has been negative (declining) when the need for power is ever increasing

[1] The inflation in the last couple of years has been reported to have reached nearly 12.5 percent.

(see Table 7). This huge decline in subsidy has impacted the poor and socially excluded more than the non-poor because the poor find it extremely difficult to muster the large equity contribution. Even when a significant proportion of equity contribution is in the form of labour, the poor can not afford even labour contribution because most of them have to earn wages for fulfilling their daily minimum needs.

5.3.2 On System Completion

As would be evident from earlier section, there have been considerable delays in the completion of the approved projects simply because the communities could not find enough equity resources to complete the project. As the equity share increased due to subsidy decline over time, it was difficult to manage the increased local resource requirement.

5.3.3 On Participating the Poor and the Socially Excluded

The penetration of RETs in the more remote areas and the poor and socially excluded has also been lesser as reported by the district officials of REDP and they have attributed this phenomenon to the declining subsidy. Even within the social catchments of the approved system, many poor have not participated as they could not afford the increasing equity contribution.

It is obvious that the RETs established in the earlier years mostly went to the non-poor, who could gather equity contributions easily. It is reported that the earlier subsidy has gone to all rich communities and about half of the medium class communities. The remaining are other half of the medium class communities and almost all of the poor and socially excluded communities. When their turn has eventually arrived after the saturation of the well-to-do communities, the subsidy rates have plummeted.

5.4 Discrete Subsidy Adjustments

The subsidy arrangements are discrete in the sense that these are not frequently amended. The first revision took about 6 years while the next revision came much earlier – within two years. If the right framework for subsidy fixation is adopted, there may be no need for amendment. For example, if the rates are fixed in percent of actual cost, the rates will be corrected annually by construct. There are reported to be two difficulties in fixing the rates on percentage terms – i) the possibility of over-invoicing on the part of local communities to get more subsidy, and ii) complexities in subsidy computation and administration. The second argument is more valid as the actual cost will be known only after the completion of the system. However, the above problems should not be so severe on RETs because the cost computations are generally mechanical and chances of over-invoicing are minimal.

5.5 Subsidy Rates Not Aligned to System Size

The subsidy rates on micro-hydro reveal that the smaller systems (less than 5 KW receive lesser subsidy than the bigger sized systems. This shows that there is no scale economy in system construction. This is reported to be true mainly due to requirement of additional transmission costs in the larger systems to cover more areas. If this is true, then there is no need for constructing the larger systems on cost-efficiency grounds. In fact, the larger systems have shown more management complexities than the smaller ones, particularly in areas where there is low social capital.

5.6 Poor Subsidizing the Non-poor

In Nepal, the poor are subsidizing the non-poor. This is happening because the public or community goods such as water, forest, etc are being disproportionately used by the non-poor in which, the poor should have equal rights. Large landholders are using more irrigation water at the same cost as the poor. Hence, the poor have not been able to use their share of right on the community resources.

Some examples of the non-poor facilitating the poor for participation are also reported. This is done in two ways – i) the non-poor contributing their lands for collateral in the case of borrowings from the financial institutions, and ii) the non-poor paying wages to the poor for the non-poor's part of the labour contribution. However, such cases are limited and even if these are there, they do not outweigh the sacrifice made by the poor on their rights to the community assets.

5.7 Quota Based Subsidy

Since only the limited amount of resources are allocated for rural energy development, it is learnt that limited quotas are allocated for each programme district and subsidy is provided only for those quota systems. There is a theory in economics which says that a subsidy applied to a quota good will hardly reach the poor. This has been true in Nepal. Hence, the inclusion objective is difficult to be achieved with quota-based subsidy arrangements.

5.8 Lack of Equity based Models

An water based system, be it for power, irrigation or drinking water, has the combination of 3 types of goods – public, community and private. The water source is generally a public good unless it happens to be within a privately owned land. Such a public good is fully owned by the state and the user rights on such source water is defined by prior appropriation. Prior appropriation right (PAR) is established based on the first use of water. It should be noted that PAR is not an equitable mechanism because only the large landholders and the rich farmers can afford to construct the system on their own and use the water first thus establishing the prior appropriation right. In fact, the right on public source water should be equal for all households within the community. In Nepal, there are some demonstrated equity models, particularly in the irrigation sub-sector. These models, which is presented in Box-1, could be used to improve the equity stance of the water projects.

Box 1: The Demonstrated Equity Models in Water Sector

The government of Nepal has spent over 100 billion rupees in the country's irrigation development since the commencement of planned development (1951). Much of this investment has been through the "Agency Model" – direct implementation by the related government department using contractors with least participation of the beneficiaries and virtually no institutional development of the users. Since the contractors had obviously no stake in the soundness of the systems, they were poorly built and as a result, over 50 percent of the systems are either defunct now or are in need of major rehabilitation. Most systems have costed over Rs.300,000 per hectare at current price while the norm should have been around Rs.100,000 per hectare. This is clearly a case of "lost infrastructure".

On the other hand, there are systems built by farmers themselves or with the help of genuine donors that stand as the true models of inclusion, equity, cost effectiveness and sustainability. At least 5 such models can be quoted in this regard. First case is Argali irrigation system in Palpa district which was built during the reign of Mani Mukunda Sen – the then King of Palpa some 400 years ago. The major feature of the scheme is the design and use of velocity corrected wooden distributors which ensured equitable distribution of water from headrace of the canal to the tailrace. If one visits the system during some crop stand, one will notice uniform crop growth at every irrigated plot from the head to the tail. Second is the Chherlung irrigation system again in Palpa district where equal water right was applied for the first time in Nepal irrespective of the amount of land owned by a household. This meant that even the landless household received the share of water which could be sold to the needy large landholders. The third is the Sorha Mauja irrigation system in Rupandehi district where rotational irrigation is practiced starting from the plots in the tail race. The fourth is the Galyang irrigation system supported by UMN in Syangja district where equal water right and long term loan for the landless as well as small holders to buy land at pre-irrigation prices was applied simultaneously. The fifth is the SAPAP model in Syangja district where other supports were extended to those households in the command catchments who could not get water for technical reasons.

6. FRAMEWORK FOR CHANGE

6.1 System Establishment

6.1.1 Incentive for Living in the Rural Areas

Living in the rural areas is more painful as such areas do not generally have the basic amenities that are available in the urban areas. Hence it is proposed that there should be a flat subsidy of 25 percent to the rural households for RET establishment irrespective of the level of poverty or other differentiating factors. The other subsidies propositions discussed in the subsequent sections are additional to the flat subsidy.

6.1.2 Difference between Economic and Financial Returns

The true basis for subsidy is the difference between the financial return from an energy technology and the economic or social return from the same technology. If the economic return is higher than the financial return, the technology user is contributing to the society more than what a household is getting. For this societal return, the household may be compensated in the form of subsidy. Such a subsidy can be perpetual as the activities of a private household is contributing for the betterment of the society and the country over and above the household itself for which there is a need for compensation.

It was not possible to estimate the actual difference between the economic and the financial return from the rural energy enterprises. However, it can be safely concluded that the economic returns will be higher by at least 20 percent in Nepal mainly because of the lower shadow wage rates of labour and the unaccounted benefits from carbon fixing from the energy projects.

<u>Returns among the Poor and the Non-poor</u>

The economic return for the poorer households is generally higher because of their low shadow price of labour. For a household with 6 family members, full agricultural employment is possible if the household has 1.5 ha of land. Since the poor have an average of less than 0.5 ha of land, their shadow wage rate is low resulting in higher difference between the financial and economic return. Table 6 presents the level of simulated underemployment in agriculture for a household of 6 persons with different level of possession of cultivated land.

Table 9: Difference in agricultural shadow Wage Rate by HH Landholding Size

HH land (ha)	Farm employment (days)	Shadow wage rate (%)	Subsidy (%)
0.2	68	13.5	37.4
0.4	136	27.0	18.7
0.6	204	40.5	12.5
0.8	272	54.0	9.3
1	340	67.5	7.5
1.2	408	81.0	6.2
1.3	442	87.7	5.7
1.4	476	94.4	5.3
1.5	510	101.2	5.0

The table shows that a household with 0.2 ha has the shadow wage rate of only 13.5 percent of the nominal wage rate and this percent improves with additional land. The difference reaches zero when the landholding size reaches about 1.5 hectare. This indicates that the poorer households are generating higher difference between the economic and financial returns and, therefore, it is justified to give more subsidy to the poor.

6.1.3 Poverty Levels

The past basis of subsidy did not differentiate between the poor and the non-poor households until the recent subsidy revision in 2008. Within an approved system, all households get proportionately equal level of subsidy. This puts more burden on the poor to contribute to the equity cost at par with the non-poor. Because of this reason, it is reported that several poor households have not participated in the system establishment and use. Since the major goal of the Government of Nepal is inclusive and participatory development, there is a need for differentiated subsidy in favour of the poor. The earlier paragraph also implicates that the poor households are generating more economic return for the society than the non-poor which means that higher subsidy for the poor need not be merely empathy-based. Further, the poor are generally using proportionately lesser share of energy and, therefore, lesser share of the public and the community goods.

Basis for Poverty Level Determination

For poor to be given more subsidy, there has to be a simple and transparent mechanism to discern the differences in the poverty levels of the households. The simplest and commonly used basis for this is the level of annual food security with household production and regular source of income. Hence, the same could be used as the basis for household poverty level determination.

Differentiating the Subsidy Levels for the Poor and the Non-poor

As shown earlier, poverty level of a household will be determined based on the food security situation with farm food production and the food that can be bought with regular source of income. A base subsidy of 50 percent has been proposed for a household with virtually zero months of food security while for those who have 12 or more months of food security will not receive any subsidy. In between, the subsidy level is computed by a linear method using the following formulae:

Subsidy percent based on poverty level = (100 - (100/12) * (12- HH food security month) percent. For example, if a household has 4 months of food security, the household will be entitled for a subsidy of (50-(50/12) * (12 - 4) = 33.3 percent. The schedule of subsidy rates based on the poverty level is presented in Table 7.

Table 10: Subsidy Percent Based on Poverty Represented by Food Security Status

Months of Food Security	Subsidy
0	50.0
1	45.8
2	41.7
3	37.5
4	33.3
5	29.2
6	25.0
7	20.8
8	16.7
9	12.5
10	8.3
11	4.2
12	0.0

Note: Food security level is defined as months of food sufficiency with own production and regular source of income

Need for VDC Classification

Livelihood in the remote VDCs is more difficult for a household than a similar household situated in the less remote area. This is basically due to higher transaction cost of living in the remote areas. Thus there is need to differentiate the subsidy level on the basis of the remoteness of the VDC. For this following formulae has been proposed:

= if (vdc cat=B,5, if (vdc cat=A,10,0)

where remoteness of the VDC, as defined by the GON – C, B and A with A category VDC being the most remote.

The formula says that households falling in category C VDCs should not be given any subsidy topping; households falling in category B VDCs should be given 5 percent subsidy topping; while the households falling in most remote category A VDCs should be given subsidy topping of 10 percent.

6.1.4 District Human Development Index

Two households having similar economic position can have different amenities based on the surrounding environment in their respective domiciles. The household having to live in a low HDI district may be less well-off with the same amount of income. Hence, there is a need for higher subsidy in districts with lower HDI. For this, the following formula has been developed:

Subsidy percent based on District HDI = ((1/(district HDI+0.5))-1)*0.2*100

The formula says that there should be no subsidy topping for districts having 0.500 or more HDI ; and for lesser than 0.500 HDI, the subsidy topping should continuously increase for lesser HDI values.

The schedule for subsidy percent based on district HDI is presented in Table 8:

Table 11: Subsidy Differentiation Schedule based on District HDI

HDI	Subsidy increase	Absolute increase	Percent subsidy
0.2	1.43	42.9	8.6
0.3	1.25	25.0	5.0
0.4	1.11	11.1	2.2
0.5	1.00	0.0	0.0
0.6	0.91	-9.1	-1.8

6.1.5 Trail Condition for Material and Equipment Transportation

It is obvious that the subsidy on transportation of materials, which is given for transportation to site from the nearest roadhead, is also declining over time. In fact, there are other issues also in transportation. The major issue is the cost of transportation up to the nearest roadhead or helipad or airport (by vehicle or helicopter or aeroplane). This cost is considerable for many districts which are away from the source of materials, and at present, there is no subsidy for this component. This means that the districts having to haul to longer distance have to bear more transport cost from their own pockets. Hence it is proposed that 50 percent of the cost of such transport be subsidized.

After the roadhead, the subsidy on transport may be fixed on the basis of actual cost. The actual cost will be derived from wage rates based on the unit distance and unit weight (e.g. Rs. per kg per km or kosh).

The other alternative, if actual cost basis is not chosen, is to have trail categorization as explained below:

<u>Trail Categorization</u>

At present, the transport subsidy has been differentiated only based on distance and not on the condition or risky-ness of the trail. In distance also, some discrete categorization has been used. Using discrete categorization is likely to cause more inequity than when continuous categorization is used. For example, when the subsidy rate is fixed for 25-50 km distance, 35 km and 50 km receive the same amount of subsidy which is not equitable. Hence, it is proposed to use actual cost of transport which is more equitable. When transport subsidy is based on actual cost, then there is no need for trail categorization as difficult trails will obviously incur more cost. However, if actual cost is not taken into account, the trails have to be categorized in terms of the risky-ness.

<u>Differentiating Subsidy Based on Trail Categories</u>

The transport subsidy based on trail categorization has been presented in Table 9.

Table 12: Proposed Transport Subsidy Based on Trail Categorization

Basic subsidy (%)	50
Category	Subsidy (percent) of actual cost
Trail category A	50
Trail category B	60
Trail category C	70

6.2 System O&M and Tariff

All the above subsidy categories are meant for system establishment and hence, these will be computed once and paid to the communities by the government. There is another subsidy category which is intended to be adjusted within the communities and which is continuous. This is the subsidy on tariff for power use. Until now, the communities have fixed tariff on the basis of number of bulbs connected and the flat tariff per bulb. But from the rights based perspective, this is not an equitable arrangement, which is also discussed earlier. Assuming that there is equal right for all community households on community assets such as water sources, the household which is using lesser share of this resource must pay lesser because he/she is subsidizing the others who are using proportionately higher share of community resources. It is therefore proposed that, the tariff should be adjusted for the poor (who use lesser share of resources by connecting lesser number of bulbs) according to the number of bulbs connected (or wattage used as opposed to the rights on wattage.

6.2.1 Rights Based Tariff

The rights based tariff based on the above argument is presented in Table 10.

Table 13: Proposed Tariff Adjustments Based on the Number of Bulbs Used

No. of bulbs per HH	HH	Entitled No. of bulbs per HH	Actual/entitled*100
1	30	3	33.3
2	20	3	66.7
3	15	3	100.0
4	10	3	133.3
5	5	3	166.7
TOTAL	**80**		

6.3 Subsidy for RET Businesses

Until now, only the subsidy for RET systems and households has been discussed. The producers and traders of RETs are equally important in promoting RETs in the rural areas. These producers/manufacturers and traders have to incur heavy investments in the initial years until they reach the threshold volume of production or business. It is proposed that such threshold level of production/business has to be estimated and a compensatory subsidy provided to them until they reach that threshold level.

6.4 Data/Parameters Required for Proposed Subsidy Workout

The data/parameters required to compute the subsidy levels for various purposes and at various levels is presented in Box 2.

Box 2: Parameters Required for Subsidy Delivery

Following data/parameters are required to deliver the subsidies on RETs following the AEPC/REDP Plus model:

- District Human Development Index (HDI)
- VDC Category (as defined by the Government of Nepal)
- Distance to median RET site from the nearest road head
- Trail category (Difficult, Medium, Easy)
- Average water discharge to be used
- RET rated capacity
- Average power to be generated per year
- Number of beneficiary households
- Poverty level of each household
- HH wise number of bulbs to be distributed by bulb capacity
- Threshold volume of business/production in the case of traders/manufacturers.

6.5 Subsidy Simulation Template

A simulation template in Microsoft excel has ben developed based on the proposed subsidy framework to compute the subsidy level under different categories for each household. This is presented in Table 11. When local data is entered into the system, then it will generate the level of subsidy for each household. This template will be made available to REDP offices for use to compute household and total subsidy.

Table 14: Sample Simulation Template for Base Data Entry and Computation of Subsidy at System and Household Level

Subsidy head	Data level	HH data	Subsidy Computation	Provider
System capacity (KW)	System	10		
Total system cost (excluding transportation)	System	275000 0		
Total beneficiary HHs	System	100		
Flat subsidy for rural households			25.0	
Flat subsidy amount (Rs./HH)			6875	
Poverty level (months of food sufficiency) (subsidy in percent)	HH	12	0.0	Government
Poverty based subsidy in Rs.			0	Government
District HDI (Factor)	District	0.300	1.250	
HDI based subsidy (percent)	HH		12.5	Government
HDI based subsidy (Rs./HH)*	HH		1432	Government
Subsidy based on VDC category	HH	a	0	
Subsidy based on VDC category (Rs./HH)			0	
Total subsidy in system cost per HH (Rs.)	HH		8307	
Subsidy in percent (HH)	HH		30.2	
Estimated transportation cost	System	275000		
Trail category (subsidy in Rs.)	Trail	c	192500	Government

Transport subsidy in percent of actual cost	System		70	
System production efficiency (%)	System	70		
Daily system output (KWh)	System	168		
Average no. of bulbs per HH		1.68		
Number of bulbs (Subsidy in percent)	HH	1		UC
Bulb based tariff subsidy/tax (Percent)	HH		40.5	
Estimated annual Maintenance cost (Rs.)	System	275000		
Bulb based subsidy per HH (Rs./year)	HH		1113.1	

** This will be equal for all beneficiary households*

A trial run of the above model for extreme cases shows that the subsidy level per household ranges from about 30 percent for the better off households (12 months of food security) living in a better HDI district and average remote VDC, to a little over 80 percent for the very poor household (1 month of food security) living in poor and remote districts and VDCs.

6.6 Subsidy Delivery Mechanism

The subsidy for RETs is provided by REF to DEF on a revolving fund basis which is then transferred to the community based on the recommendation of Technical Review Committee. The arrangement is found to be satisfactory except for the few cases of delays which were not due to institutional mechanism but for other reasons – mainly the failure of the communities to collect equity contributions in time.

While the subsidy delivery arrangement through DEF is found to be satisfactory, the centralized planning and monitoring arrangements for RETs may not be enough to cover the whole country. Several monitoring difficulties have already been reported because of such centralized functioning. This function has to be decentralized to the regional level, at the least. This can be done through one of the following two ways – i) creation of REDP Regional offices for technical backup and monitoring; or ii) outsourcing to regional NGOs as is done in the case of operation and management contracts awarded to regional NGOs for running the 8 Regional Renewable Energy Service Centres (RRESCs). The regional NGOs involved in RRESCs have the required experience in the RETs and hence they could be potential candidates, should the outsourcing option be chosen. The regional monitoring outfit may also function as facilitating units for the credit needs of the communities for the equity part of the communities.

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

From this study, the following conclusions have been drawn:

- Rural areas have not received their fair share of investment in the power development and use sector
- Subsidies on RETs have sharply declined over time resulting in:
  - Declining system demand due to inability to muster equity contributions
  - Systems prone to be demanded from the well-off areas only thus increasing the probability of excluding the poor and the socially excluded

- Poor excluded even within the command area of the approved and completed schemes

- The basis or framework for subsidy arrangement is not congruent thus needing frequent ammendment.
- Subsidies are amended on a discrete basis
- There is a need to reform the subsidy arrangement
- Current subsidy delivery institutional mechanism is satisfactory but there is a need to have decentralized or deconcentrated arrangement for monitoring.

7.2 Recommendations

Following recommendations have been made based on the observation and analysis of the current practices and the analysis of the available data/information:

- Allocation for rural energy development must be increased considerably by mobilizing more donors;
- Subsidy level should be fixed on percentage of cost basis rather than on absolute amount;
- Subsidy arrangements for RET establishment must be categorized and extended based on the poverty level of households, VDC classification, HDI of the district as proposed in Chapter 5 of this report;
- Subsidy levels have to be increased and fixed as proposed in chapter 5 of this report;
- No additional subsidy for cost overruns and delays should be provided as it encourages efficiency
- Communities must be encouraged to adjust tariff arrangements for members on right-based approach as discussed in chapter 6 of this report.
- There is a need to have decentralized or deconcentrated arrangement for monitoring.

Annex-1: Checklist

Subsidy Rates and Delivery Mechanisms for Rural Energy Technologies

1. Model

Which one for the following models are applicable for construction/O & M?

Implementation		OP & M
Agency (A)	NEA	NEA
Agency- CBO	REDP	CBO
Agency- Pvt.	ADB/N	Pvt.
CBO	CBO	CBO
Pvt Co.	SCECO	Pvt. Co.
LB (Local Bodies)- CBO		

2. Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? If no, how should it be changed?

MHP

Peltric sets

SHS

Solar cooker

Solar dryer

Improved water mill

Cookstove

Biogas

Wind energy

3. Is the current subsidy delivery mechanism efficient and timely? If no, what should be the new mechanism?

MHP

Peltric sets

SHS

Solar cooker

Solar dryer

Improved water mill

Cookstove

Biogas

Wind energy

4. Is the basis for subsidy determination optimal? If not, what should be the optimal basis for subsidy determination?

MHP

Peltric sets

SHS

Solar cooker

Solar dryer

Improved water mill

Cookstove

Biogas

Wind energy

5. **Is the existing VDC category classification satisfactory? If not, what should be the better basis for VDC category classification.**

   MHP

   Peltric sets

   SHS

   Solar cooker

   Solar dryer

   Improved water mill

   Cookstove

   Biogas

   Wind energy

6. **Is the RET classification satisfactory? If not, what should be the better basis for RET classification?**

   MHP

   Peltric sets

   SHS

   Solar cooker

   Solar dryer

   Improved water mill

   Cookstove

   Biogas

   Wind energy

7. **How do you locally define the poor and socially excluded?**

8. **Has this local definition of poor and excluded been compatible with that used by AEPC/REDP now? If not, how should REDP/AEPC modify the definition of poor and socially excluded?**

9. **Up to when should the subsidy for RETs continue?**

   Is there a need for differential subsidy (higher level of subsidy for the poor and socially excluded? If yes, what should be the basis for differentiation and why?

Annex 2: Questions to REDP District Officials

REDP has awarded a contract to SAPPROS Nepal for the above study. The study is being undertaken by a SAPPROS team led by Dr. Govind P. Koirala. The study team has requested the REDP district offices to respond to 12 questions put forth below to support the study findings. Please respond to these questions on a priority basis at your earliest convenience.

Questions for REDP District Offices

1. Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? If no, how should it be changed?
2. Is there a need for differential subsidy (higher level of subsidy for the poor and socially excluded? If yes, what should be the basis for differentiation and why?
3. Is the current subsidy delivery mechanism efficient and timely? If no, what should be the new mechanism?
4. Is the basis for subsidy determination optimal? If not, what should be the optimal basis for subsidy determination?
5. Are there cases when the approved systems have remained incomplete because the beneficiaries could not muster enough resources as their equity contribution? If yes, give the system name, location, percent work completed and time taken for the work completed.
6. Has there been delays in the completion of the RET works due to lack of resources on the part of beneficiaries as their equity contribution? If yes, how long than normal?
7. Has it been difficult for including the poor and socially excluded in the already approved systems because they could not provide their share of equity contribution?
8. Has there been the cases of richer households subsidizing the poorer households in meeting the equity contribution requirements? If yes, how and where?
9. Has the newer RET systems been gone in relatively well-off areas because of declining subsidy? If no, provide evidence.
10. Has it been difficult over time to reach the remote areas and poorer households? If no, provide evidence.
11. Has it been difficult to include the poor and socially excluded households within an approved system because they can not afford increased equity contribution? If yes, where and how many?
12. Please fill the following table:

RETs	Unit and capacity	Approximate cost per unit at year 2000		Approximate cost per unit at year 2008		Unskilled labour wage rate at year 2000	Unskilled labour wage rate at year 2008
		Material	Labour	Material	Labour		
MHP							
Peltric sets							
SHS							
Solar cooker							
Solar dryer							
Improved water mill							
ICS							
Biogas							
Wind energy							

Annex 3: Results of the District Questionnaire Survey (all samples), 2009

QN	SQN	Questions	Results Total			
			Yes	No	Average	Variance
Q 1	1.1	Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? [Yes=1, No=0]	3	6		
	1.2	If no, how should it be changed?			60	175
Q 2	2.1	Is there a need for differential subsidy to the poor?	2	7		
	2.2	If yes, what should be the basis?				
Q 3	3.1	Is the current subsidy delivery mechanism efficient and timely? [Yes=1, No=0]	5	3		
	3.2	If no, what should be the new mechanism?				
Q 4	4.1	Is the basis for subsidy determination optimal? [Yes=1, No=0]	3	5		
	4.2	If not, what should be the optimal basis for subsidy determination?				
Q 5	5.1	Are there cases when the systems have remained incomplete because they could not muster equity contribution? [Yes=1, No=0]	1	6		
	5.2	If not, system name				
	5.3	Location				
	5.4	Percent work completed				
Q 6	6.1	Has there been delays in RET completion due to lack of resources? [Yes=1, No=0]	6	3		
Q 7	7.1	Has it been difficult for including the poor due to equity requirement? [Yes=1, No=0]	2	6		
Q 8	8.1	Have there been cases of richer HHs subsidizing the poor? [Yes=1, No=0]	2	6		
	8.2	Where				
	8.3	How?				
Q 9	9.1	Has the newer RET systems gone in relatively well-off areas because of declining subsidy? [Yes=1, No=0]	6	0		
	9.2	If no, Evidence				
Q 10	10.1	Has it been difficult over time to reach the remote areas and poorer HHs? [Yes=1, No=0]	4	3		
	10.2	If no, evidence				
Q 11	11.1	Has it been difficult to include the poor in an approved system due to equity? [Yes=1, No=0]	4	2		
	11.2	If yes, where?				
	11.3	How many?				
Q 12	12.1	MHP cost per KW 10 years ago				
	12.2	Material			114305	1403
	12.3	Labour			25363	234
	12.4	Total			108631	5188
Q 13	13.1	MHP cost per KW now				
	13.2	Material			183994	979
	13.3	Labour			44958	466

	13.4	Total			197963	6562
Q 14	14.1	Unskilled wage rate 10 years ago			111	2832
	14.2	Unskilled wage rate now			193	2235
		Increase in MH cost Total (%)			82	26
		Material			61	-30
		Labour			77	99
		Labour wage rate increase (%)			75	-21

Annex 4: Results of the District Questionnaire Survey (Mountain samples), 2009

(Solukhumbu, Sindhupalchok, Darchula Districts)

QN	SQN	Questions	Results Mountain			
			Yes	No	Average	Variance
Q 1	1.1	Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? [Yes=1, No=0]	1	2		
	1.2	If no, how should it be changed?			#DIV/0!	#DIV/0!
Q 2	2.1	Is there a need for diffrential subsidy to the poor?	2	1		
	2.2	If tes, what should be the basis?				
Q 3	3.1	Is the current subsidy delivery mechanism efficient and timely? [Yes=1, No=0]	3	0		
	3.2	If no, what should be the new mechanism?				
Q 4	4.1	Is the basis for subsidy determination optimal? [Yes=1, No=0]	1	2		
	4.2	If not, what should be the optimal basis for subsidy determination?				
Q 5	5.1	Are there cases when the systems have remained incomplete because they could not muster equity contribution? [Yes=1, No=0]	0	2		
	5.2	If not, system name				
	5.3	Location				
	5.4	Percent work completed				
Q 6	6.1	Has there been delaysin RET completion due to lack of resources? [Yes=1, No=0]	1	2		
Q 7	7.1	Has it been difficult for including the poor due to equity requirement? [Yes=1, No=0]	1	2		
Q 8	8.1	Has there been cases of richer HHs subsidizing the poor? [Yes=1, No=0]	1	2		
	8.2	Where				
	8.3	How?				
Q 9	9.1	Has the newer RET systems gone in relatively well-off areas because of declining subsidy? [Yes=1, No=0]	3	0		
	9.2	If no, Evidence				
Q 10	10.1	Has it been difficult over time to reach the remote areas and poorer HHs? [Yes=1, No=0]	0	3		
	10.2	If no, evidence				
Q 11	11.1	Has it been difficult to include the poor in an approved system due to equity? [Yes=1, No=0]	1	0		
	11.2	If yes, where?				
	11.3	How many?				
Q 12	12.1	MHP cost per KW 10 years ago				
	12.2	Material			95000	23250
	12.3	Labour			18333	1083
	12.4	Total			113333	34333
Q 13	13.1	MHP cost per KW now				

QN	SQN	Questions	Results Mountain			
			Yes	No	Average	Variance
	13.2	Material			173333	7583
	13.3	Labour			36667	2333
	13.4	Total			210000	18250
Q 14	14.1	Unskilled wage rate 10 years ago			120	5700
	14.2	Unskilled wage rate now			207	2633
		Increase in MH cost Total (%)			85	-47
		Material			82	-67
		Labour			100	115
		Labour wage rate increase (%)			72	-54

Annex 5: Results of the District Questionnaire Survey (Hill samples), 2009

(Panchthar, Okhaldhunga, Kavre, Jajarkot, Doti Districts)

QN	SQN	Questions	Results Hills			
			Yes	No	Average	Variance
Q 1	1.1	Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? [Yes=1, No=0]	2	4		
	1.2	If no, how should it be changed?				
Q 2	2.1	Is there a need for diffrential subsidy to the poor?	5	1		
	2.2	If tes, what should be the basis?				
Q 3	3.1	Is the current subsidy delivery mechanism efficient and timely? [Yes=1, No=0]	2	3		
	3.2	If no, what should be the new mechanism?				
Q 4	4.1	Is the basis for subsidy determination optimal? [Yes=1, No=0]	2	3		
	4.2	If not, what should be the optimal basis for subsidy determination?				
Q 5	5.1	Are there cases when the systems have remained incomplete because they could not muster equity contribution? [Yes=1, No=0]	1	4		
	5.2	If not, system name				
	5.3	Location				
	5.4	Percent work completed				
Q 6	6.1	Has there been delaysin RET completion due to lack of resources? [Yes=1, No=0]	5	1		
Q 7	7.1	Has it been difficult for including the poor due to equity requirement? [Yes=1, No=0]	1	4		
Q 8	8.1	Has there been cases of richer HHs subsidizing the poor? [Yes=1, No=0]	1	4		
	8.2	Where				
	8.3	How?				
Q 9	9.1	Has the newer RET systems gone in relatively well-off areas because of declining subsidy? [Yes=1, No=0]	3	0		
	9.2	If no, Evidence				
Q 10	10.1	Has it been difficult over time to reach the remote areas and poorer HHs? [Yes=1, No=0]	4	0		
	10.2	If no, evidence				
Q 11	11.1	Has it been difficult to include the poor in an approved system due to equity? [Yes=1, No=0]	3	2		
	11.2	If yes, where?				
	11.3	How many?				
Q 12	12.1	MHP cost per KW 10 years ago				
	12.2	Material			128784	6046

	12.3	Labour			30635	3100
	12.4	Total			159419	2166
Q 13	13.1	MHP cost per KW now				
	13.2	Material			191989	12529
	13.3	Labour			51177	6555
	13.4	Total			243165	2301
Q 14	14.1	Unskilled wage rate 10 years ago			94	1823
	14.2	Unskilled wage rate now			175	2500
		Increase in MH cost Total (%)			#DIV/0!	53
		Material			49	107
		Labour			#DIV/0!	67
		Labour wage rate increase (%)			87	37

Annex 6: Results of the District Questionnaire Survey (Samples from the East), 2009

(Panchthar, Okhaldhunga, Solukhumbu, Sindhupalchok, Kavre Districts)

QN	SQN	Questions	Results East			
			Yes	No	Average	Variance
Q 1	1.1	Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? [Yes=1, No=0]	0	6		
	1.2	If no, how should it be changed?			60	175
Q 2	2.1	Is there a need for diffrential subsidy to the poor?	6	0		
	2.2	If tes, what should be the basis?				
Q 3	3.1	Is the current subsidy delivery mechanism efficient and timely? [Yes=1, No=0]	2	3		
	3.2	If no, what should be the new mechanism?				
Q 4	4.1	Is the basis for subsidy determination optimal? [Yes=1, No=0]	0	5		
	4.2	If not, what should be the optimal basis for subsidy determination?				
Q 5	5.1	Are there cases when the systems have remained incomplete because they could not muster equity contribution? [Yes=1, No=0]	1	4		
	5.2	If not, system name				
	5.3	Location				
	5.4	Percent work completed				
Q 6	6.1	Has there been delaysin RET completion due to lack of resources? [Yes=1, No=0]	5	1		
Q 7	7.1	Has it been difficult for including the poor due to equity requirement? [Yes=1, No=0]	1	4		
Q 8	8.1	Has there been cases of richer HHs subsidizing the poor? [Yes=1, No=0]	1	4		
	8.2	Where				
	8.3	How?				
Q 9	9.1	Has the newer RET systems gone in relatively well-off areas because of declining subsidy? [Yes=1, No=0]	4	0		
	9.2	If no, Evidence				
Q 10	10.1	Has it been difficult over time to reach the remote areas and poorer HHs? [Yes=1, No=0]	2	2		
	10.2	If no, evidence				
Q 11	11.1	Has it been difficult to include the poor in an approved system due to equity? [Yes=1, No=0]	4	2		
	11.2	If yes, where?				
	11.3	How many?				
Q 12	12.1	MHP cost per KW 10 years ago				
	12.2	Material			138750	5063

	12.3	Labour			29375	3016
	12.4	Total			112083	76510
Q 13	13.1	MHP cost per KW now				
	13.2	Material			196250	12229
	13.3	Labour			50000	6500
	13.4	Total			194001	98900
Q 14	14.1	Unskilled wage rate 10 years ago			100	2500
	14.2	Unskilled wage rate now			185	2375
		Increase in MH cost Total (%)			47	71
		Material			42	122
		Labour			79	625
		Labour wage rate increase (%)			113	6306

Annex 7: Results of the District Questionnaire Survey (Samples from the West), 2009

(Darchula, Doti, Jajarkot districts)

QN	SQN	Questions	Results west			
			Yes	No	Average	Variance
Q 1	1.1	Is the current subsidy level for various RETs adequate to reach the poor and socially excluded households? [Yes=1, No=0]	3	0		
	1.2	If no, how should it be changed?			#DIV/0!	#DIV/0!
Q 2	2.1	Is there a need for diffrential subsidy to the poor?	1	2		
	2.2	If tes, what should be the basis?				
Q 3	3.1	Is the current subsidy delivery mechanism efficient and timely? [Yes=1, No=0]	3	0		
	3.2	If no, what should be the new mechanism?				
Q 4	4.1	Is the basis for subsidy determination optimal? [Yes=1, No=0]	3	0		
	4.2	If not, what should be the optimal basis for subsidy determination?				
Q 5	5.1	Are there cases when the systems have remained incomplete because they could not muster equity contribution? [Yes=1, No=0]	0	2		
	5.2	If not, system name				
	5.3	Location				
	5.4	Percent work completed				
Q 6	6.1	Has there been delaysin RET completion due to lack of resources? [Yes=1, No=0]	1	2		
Q 7	7.1	Has it been difficult for including the poor due to equity requirement? [Yes=1, No=0]	1	2		
Q 8	8.1	Has there been cases of richer HHs subsidizing the poor? [Yes=1, No=0]	1	2		
	8.2	Where				
	8.3	How?				
Q 9	9.1	Has the newer RET systems gone in relatively well-off areas because of declining subsidy? [Yes=1, No=0]	2	0		
	9.2	If no, Evidence				
Q 10	10.1	Has it been difficult over time to reach the remote areas and poorer HHs? [Yes=1, No=0]	2	1		
	10.2	If no, evidence				
Q 11	11.1	Has it been difficult to include the poor in an approved system due to equity? [Yes=1, No=0]	0	3		
	11.2	If yes, where?				
	11.3	How many?				
Q 12	12.1	MHP cost per KW 10 years ago				
	12.2	Material			81712	6622

	12.3	Labour			20013	1756
	12.4	Total			101725	15159
Q 13	13.1	MHP cost per KW now				
	13.2	Material			167652	4006
	13.3	Labour			38235	3035
	13.4	Total			205887	13822
Q 14	14.1	Unskilled wage rate 10 years ago			128	4158
	14.2	Unskilled wage rate now			207	2633
		Increase in MH cost Total (%)			113	1808
		Material			114	1716
		Labour			108	3098
		Labour wage rate increase (%)			75	1875

Annex-8: REDP Progress Statistics by Year

Year 1998						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
						Darchula
2	35	268				Baitadi
2	11	112				Dandeldhura
						Bajhang
						Bajura
						Doti
						Achham
						Humla
						Mugu
						Dailekh
						Pyuthan
						Myagdi
4	29	306			290	Baglung
						Parbat
1	12	53		15		Tanahun
						Dolakha
						Sindhupalchok
3	36	301				Kavre
						Dhading
						Solu
						Okhaldhunga
						Sankhuwasabha
						Terhathum
12	123	1040	0	15	290	TOTAL
0	0	0	0	0	0	FWM
4	46	380	0	0	0	FWH
4	46	380	0	0	0	FW
0	0	0	0	0	0	MWM
0	0	0	0	0	0	MWH
0	0	0	0	0	0	MW
						WM
5	41	359	0	15	290	WH
5	41	359	0	15	290	W
0	0	0	0	0	0	CM
3	36	301	0	0	0	CH
3	36	301	0	0	0	C
0	0	0	0	0	0	EM
0	0	0	0	0	0	EH
0	0	0	0	0	0	E
0	0	0	0	0	0	M
12	123	1040	0	15	290	H

Year 1999						
MH/Peltric			Solar PV	Biogas	ICS	Particluar
No.	KW	HH				
						Darchula
1	9	80			144	Baitadi
2	28	207			169	Dandeldhura
						Bajhang
						Bajura
						Doti
1	15	110				Achham
						Humla
						Mugu
						Dailekh
						Pyuthan
2	41	300	56		36	Myagdi
5	72	789			740	Baglung
2	15	145			296	Parbat
4	87	629	81	29		Tanahun
1	20	172				Dolakha
						Sindhupalchok
1	5	80				Kavre
						Dhading
						Solu
						Okhaldhunga
						Sankhuwasabha
						Terhathum
						Taplejung
						Panchthar
19	292	2512	137	29	1385	TOTAL
0	0	0	0	0	0	FWM
4	52	397	0	0	313	FWH
4	52	397	0	0	313	FW
0	0	0	0	0	0	MWM
0	0	0	0	0	0	MWH
0	0	0	0	0	0	MW
						WM
13	215	1863	137	29	1072	WH
13	215	1863	137	29	1072	W
1	20	172	0	0	0	CM
1	5	80	0	0	0	CH
2	25	252	0	0	0	C
0	0	0	0	0	0	EM
0	0	0	0	0	0	EH
0	0	0	0	0	0	E
1	20	172	0	0	0	M
18	272	2340	137	29	1385	H

Year 2000						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
						Darchula
			63	7	94	Baitadi
			47	18	57	Dandeldhura
						Bajhang
						Bajura
						Doti
1	15	140	13		89	Achham
						Humla
						Mugu
						Dailekh
						Pyuthan
1	35	288	153		119	Myagdi
2	10.5	109	100	56	109	Baglung
1	27	258	88	17	203	Parbat
1	1.5	20	128	97	571	Tanahun
3	50	485	38	9	568	Dolakha
3	55	522	9		191	Sindhupalchok
4	72	597	127	177	472	Kavre
						Dhading
						Solu
16	266	2419	766	381	2473	TOTAL
0	0	0	0	0	0	FWM
1	15	140	123	25	240	FWH
1	15	140	123	25	240	FW
0	0	0	0	0	0	MWM
0	0	0	0	0	0	MWH
0	0	0	0	0	0	MW
						WM
5	74	675	469	170	1002	WH
5	74	675	469	170	1002	W
6	105	1007	47	9	759	CM
4	72	597	127	177	472	CH
10	177	1604	174	186	1231	C
0	0	0	0	0	0	EM
0	0	0	0	0	0	EH
0	0	0	0	0	0	E
6	105	1007	47	9	759	M
10	161	1412	719	372	1714	H
Year 2001						

MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
						Darchula
4	52	452	31	1		Baitadi
1	10	75	25	31	72	Dandeldhura
						Bajhang
						Bajura
						Doti
3	42	481	6		136	Achham
						Humla
						Mugu
						Dailekh
						Pyuthan
5	88	814	1	72	105	Myagdi
2	27.5	275	26	38	275	Baglung
3	46	405	10	7	179	Parbat
5	55	459		382	112	Tanahun
2	28	357	17	7	333	Dolakha
2	42	410	5	16	99	Sindhupalchok
2	42	390		305	140	Kavre
						Dhading
						Solu
						Okhaldhunga
						Sankhuwasabha
					62	Terhathum
						Taplejung
						Panchthar
29	432.5	4118	121	859	1513	TOTAL
0	0	0	0	0	0	FWM
8	104	1008	62	32	208	FWH
8	104	1008	62	32	208	FW
0	0	0	0	0	0	MWM
0	0	0	0	0	0	MWH
0	0	0	0	0	0	MW
						WM
15	216.5	1953	37	499	671	WH
15	216.5	1953	37	499	671	W
4	70	767	22	23	432	CM
2	42	390	0	305	140	CH
6	112	1157	22	328	572	C
0	0	0	0	0	0	EM
0	0	0	0	0	62	EH
0	0	0	0	0	62	E
4	70	767	22	23	432	M
25	362.5	3351	99	836	1081	H

Year 2002						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
						Darchula
			2		17	Baitadi
1	7	41	2		11	Dandeldhura
						Bajhang
					22	Bajura
						Doti
1	12	150			46	Achham
						Humla
						Mugu
						Dailekh
1	16	190		15		Pyuthan
				28	140	Myagdi
11	74.5	809	49	46	789	Baglung
1	12	110	2	18	38	Parbat
1	6	60		149	7	Tanahun
2	5.5	81	19	9	70	Dolakha
3	8	117	34	18	8	Sindhupalchok
2	25	238		1052	86	Kavre
						Dhading
						Solu
1	8	82	1	4	61	Okhaldhunga
						Sankhuwasabha
1	25	202				Terhathum
						Taplejung
						Panchthar
25	199	2080	109	1339	1295	TOTAL
0	0	0	0	0	22	FWM
2	19	191	4	0	74	FWH
2	19	191	4	0	96	FW
0	0	0	0	0	0	MWM
1	16	190	0	15	0	MWH
1	16	190	0	15	0	MW
						WM
13	92.5	979	51	241	974	WH
13	92.5	979	51	241	974	W
5	13.5	198	53	27	78	CM
2	25	238	0	1052	86	CH
7	38.5	436	53	1079	164	C
0	0	0	0	0	0	EM
2	33	284	1	4	61	EH
2	33	284	1	4	61	E
5	13.5	198	53	27	100	M
20	185.5	1882	56	1312	1195	H

Year 2003						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
			18			Darchula
1	18	210	3		25	Baitadi
1	12	45			23	Dandeldhura
						Bajhang
					40	Bajura
						Doti
2	21	223	9		31	Achham
						Humla
						Mugu
1	16	158			123	Dailekh
1	11	139			250	Pyuthan
2	35	342			183	Myagdi
10	129.5	1326	10	4	1305	Baglung
			29	31	9	Parbat
1	6	60		147		Tanahun
			4	6	37	Dolakha
4	24.2	210	1	11	8	Sindhupalchok
2	14	104		482		Kavre
						Dhading
						Solu
2	20	284	5	5	75	Okhaldhunga
						Sankhuwasabha
1	18	155				Terhathum
						Taplejung
						Panchthar
28	324.7	3256	79	686	2109	TOTAL
0	0	0	18	0	40	FWM
4	51	478	12	0	79	FWH
3	33	268	9	0	54	FW
0	0	0	0	0	0	MWM
2	27	297	0	0	373	MWH
2	27	297	0	0	373	MW
						WM
13	170.5	1728	39	182	1497	WH
13	170.5	1728	39	182	1497	W
4	24.2	210	5	17	45	CM
2	14	104	0	482	0	CH
6	38.2	314	5	499	45	C
0	0	0	0	0	0	EM
3	38	439	5	5	75	EH
3	38	439	5	5	75	E
4	24.2	210	23	17	85	M
24	300.5	3046	56	669	2024	H

Year 2004						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
			29	10		Darchula
				1	3	Baitadi
					25	Dandeldhura
						Bajhang
1	20	186				Bajura
			8		18	Doti
					30	Achham
						Humla
						Mugu
					54	Dailekh
2	24	236				Pyuthan
						Myagdi
2	21	210	22		210	Baglung
1	21	204	17	5	6	Parbat
				15		Tanahun
1	15	154				Dolakha
						Sindhupalchok
						Kavre
						Dhading
						Solu
2	21	229	11	14	81	Okhaldhunga
						Sankhuwasabha
5	16	161	34	17	157	Terhathum
						Taplejung
						Panchthar
14	138	1380	121	62	584	TOTAL
1	20	186	29	10	0	FWM
0	0	0	8	1	76	FWH
1	20	186	37	11	76	FW
0	0	0	0	0	0	MWM
2	24	236	0	0	54	MWH
2	24	236	0	0	54	MW
						WM
3	42	414	39	20	216	WH
3	42	414	39	20	216	W
1	15	154	0	0	0	CM
0	0	0	0	0	0	CH
1	15	154	0	0	0	C
0	0	0	0	0	0	EM
7	37	390	45	31	238	
7	37	390	45	31	238	E
2	35	340	29	10	0	M
12	103	1040	92	52	584	H

Year 2005						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
			58	2		Darchula
1	10	86			159	Baitadi
					2	Dandeldhura
					50	Bajhang
						Bajura
			10		22	Doti
			14		4	Achham
						Humla
						Mugu
					45	Dailekh
1	18	211		30		Pyuthan
				31		Myagdi
4	39	429	89	83	429	Baglung
					25	Parbat
1	6	65		120	61	Tanahun
1	4	44				Dolakha
1	20	279	30	16	75	Sindhupalchok
2	41	397	3	20	5	Kavre
					22	Dhading
			34		8	Solu
			2	2	76	Okhaldhunga
						Sankhuwasabha
2	53	475	11		69	Terhathum
						Taplejung
						Panchthar
13	191	1986	251	304	1052	TOTAL
0	0	0	58	2	50	FWM
1	10	86	24	0	187	FWH
1	10	86	82	2	237	FW
0	0	0	0	0	0	MWM
1	18	211	0	30	45	MWH
1	18	211	0	30	45	MW
						WM
5	45	494	89	234	515	WH
5	45	494	89	234	515	W
2	24	323	30	16	75	CM
2	41	397	3	20	27	CH
4	65	720	33	36	102	C
0	0	0	34	0	8	EM
2	53	475	13	2	145	EH
2	53	475	47	2	153	E
2	24	323	122	18	133	M
11	167	1663	129	286	919	H

Year 2006						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
			21	4	5	Darchula
1	22	225	2		5	Baitadi
1	12	105			17	Dandeldhura
					75	Bajhang
						Bajura
			11		26	Doti
1	8	83	31		24	Achham
						Humla
						Mugu
			79		63	Dailekh
1	18	219				Pyuthan
				53		Myagdi
4	48	459			459	Baglung
				13	78	Parbat
				110	17	Tanahun
2	40	408				Dolakha
1	40	350		48	34	Sindhupalchok
						Kavre
				16	140	Dhading
						Solu
1	12	125	4	2	62	Okhaldhunga
				8	35	Sankhuwasabha
1	20	175	10	57	55	Terhathum
3	61	576		15	250	Taplejung
1	12	108			116	Panchthar
17	293	2833	158	326	1461	TOTAL
0	0	0	21	4	80	FWM
3	42	413	44	0	72	FWH
3	42	413	65	4	152	FW
0	0	0	0	0	0	MWM
1	18	219	79	0	63	MWH
1	18	219	79	0	63	MW
						WM
4	48	459	0	176	554	WH
4	48	459	0	176	554	W
3	80	758	0	48	34	CM
0	0	0	0	16	140	CH
3	80	758	0	64	174	C
3	61	576	0	23	285	EM
3	44	408	14	59	233	EH
6	105	984	14	82	518	E
6	141	1334	21	75	399	M
11	152	1499	137	251	1062	H

TOTAL						
MH/Peltric			Solar PV	Biogas	ICS	Particular
No.	KW	HH				
0	0	0	126	16	5	Darchula
10	146	1321	101	9	447	Baitadi
8	80	585	74	49	376	Dandeldhura
0	0	0	0	0	125	Bajhang
1	20	186	0	0	62	Bajura
0	0	0	29	0	66	Doti
9	113	1187	73	0	360	Achham
0	0	0	0	0	0	Humla
0	0	0	0	0	0	Mugu
1	16	158	79	0	285	Dailekh
6	87	995	0	45	250	Pyuthan
10	199	1744	210	184	583	Myagdi
44	451	4712	296	227	4606	Baglung
8	121	1122	146	91	834	Parbat
14	173.5	1346	209	1064	768	Tanahun
12	162.5	1701	78	31	1008	Dolakha
14	189.2	1888	79	109	415	Sindhupalchok
16	235	2107	130	2036	703	Kavre
0	0	0	0	16	162	Dhading
0	0	0	34	0	8	Solu
6	61	720	23	27	355	Okhaldhunga
0	0	0	0	8	35	Sankhuwasabha
10	132	1168	55	74	343	Terhathum
3	61	576	0	15	250	Taplejung
1	12	108	0	0	116	Panchthar
173	2259.2	21624	1742	4001	12162	TOTAL
1	20	186	126	16	192	FWM
27	339	3093	277	58	1249	FWH
28	359	3279	403	74	1441	FW
0	0	0	0	0	0	MWM
7	103	1153	79	45	535	MWH
7	103	1153	79	45	535	MW
						WM
76	944.5	8924	861	1566	6791	WH
76	944.5	8924	861	1566	6791	W
26	351.7	3589	157	140	1423	CM
16	235	2107	130	2052	865	CH
42	586.7	5696	287	2192	2288	C
3	61	576	34	23	293	EM
17	205	1996	78	101	814	EH
20	266	2572	112	124	1107	E
30	432.7	4351	317	179	1908	M
143	1826.5	17273	1425	3822	10254	H