

Final report:

**Preparation of 13th Three-Year Renewable Energy Sector Plan
(2013/14-2015/16)**

Submitted to:

**Alternative Energy Promotion Centre
National Rural & Renewable Energy Programme
Khumaltar Heights
Lalitpur Sub Metropolitan City
Nepal**

Submitted by:

**Tek Bahadur Gurung
Consultant/Renewable Energy Expert**

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Acronyms

ADB	Asian Development Bank
ADDCN	Association of District Development Committees of Nepal
AEPC	Alternative Energy Promotion Centre
BETs	Biomass energy technologies
CDM	Clean Development Mechanism
CREF	Central Renewable Energy Fund
CRT/N	Centre for Rural Technology Nepal
DANIDA	Danish International Development Agency
DfID	Department for International Development (of UK Government)
DDC	District Development Committee
DEECCS	District Energy, Environment and Climate Change Section
DEEU/S	District Energy and Environment Unit/Section
EFLG	Environment Friendly Local Governance
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse gas
GoN	Government of Nepal
ICIMOD	International Centre for Integrated Mountain Development
ICS	Improved Cook Stove
IGA	Income-generating activities
IWM	Improved water mill
KfW	Kreditanstalt für Wiederaufbau Development Bank (Germany)
LDC	Least developed country
LSGA	Local Self-Governance Act, 1999
MDGs	Millennium Development Goals
MH	Micro-hydro
MSMEs	Micro, small and medium sized enterprises
MoFALD	Ministry of Federal Affairs and Local Development
MoSTE	Ministry of Science, Technology and Environment
NACC	Nepal Alliance for Clean Cookstoves
NBPA	Nepal Biogas Promoters Association
NAVIN	National Association of VDC in Nepal
NGO	Non-Governmental Organisation
NLSS	Nepal Living Standard Survey
NMHDA	Nepal Micro Hydropower Development Association
NPC	National Planning Commission
NRREP	National Renewable and Rural Energy Programme
PMAS/DPMAS	Poverty Monitoring and Analysis System/District Poverty Monitoring and Analysis System
REDB	Renewable Energy Development Board
RERL	Renewable Energy for Rural Livelihoods Programme
RET	Renewable Energy Technology
RETS	Renewable Energy Testing Station
SAARC	South Asian Association for Regional Cooperation
SE4All	Sustainable Energy for All
SEMAN	Solar Energy Manufacturers' Association of Nepal
SHS	Solar Home System
SNV	Netherlands Development Organisation

SOD	Strategic and Organisational Development
SWAp	Sector-wide approach
UNDP	United Nations Development Programme
VDC	Village Development Committee
WB	World Bank

1. Introduction

Alternative Energy Promotion Centre (AEPC) is a national executing agency of renewable energy programme and projects in Nepal under the Ministry of Science, Technology and Environment (MoSTE). With the mandate of policy and plan formulation, technology innovation, resource mobilization and coordination and quality assurance, the mission of AEPC is to make renewable energy a mainstream resource through increased access thereby, contributing for the improved living conditions of people in Nepal. AEPC is implementing a National Rural and Renewable Energy Programme (NRREP), a single programme modality for the promotion and dissemination of renewable energy technologies under various sub/components and units from mid-July 2012 to mid-July 2017¹.

The National Planning Commission (NPC), with regard to the Renewable Energy Sector's technical aspects of the plan preparation and the needed participatory processes to secure stakeholder consensus, has requested AEPC to prepare a 3-year plan².

This final report has been prepared to briefly narrate the study conducted for "Preparation of the 13th Three-Year Renewable Energy Sector Plan" in terms of the methodology to prepare the Plan and products that emerged in the process. The Plan was prepared in Nepali, the English version of which has been annexed (See Annex - 1).

2. Objective of the study and scope of work

As specified in the Terms of Reference (ToR) the objective of the assignment was "to facilitate for coherency in policy and coordination for delivery of rural energy services with focus on decentralisation and private sector".

Similarly, the scope of work included assisting AEPC/NRREP in following main activities:

1. Draft the 13th Three Year Renewable Energy Sector Plan in close consultation with the AEPC/NRREP, MOSTE, MoE, NPC, etc.
2. Coordinate, organize, and participate in all activities as deemed necessary in relation to dissemination of information on the prepared document during Stakeholder Workshop.

3. Duration of Study

The study was carried out from 1 December 2013 to 15 January 2014.

4. Methodology

The methodology followed the guidance outlined in the ToR which was further elaborated in the inception report. A summary of the methodological steps taken may be presented as follows:

1. Preliminary discussion with AEPC clarifying the expectations and deliverables.
2. Review of literature including the preliminary draft of the plan prepared by AEPC.
3. Pre-consultation meeting with various stakeholders at AEPC.
4. Meetings with officials of AEPC/NRREP components.

¹ Taken from ToR (Annex 1).

² Loc. cit.

5. Meetings with relevant government agencies.
6. Meetings with private sectors, NGOs and donors.
7. Meetings with NPC's Thematic Group, and consultants.
8. Analysing of information and report writing.

The list of officials consulted is presented in the Annex 2.

On the basis of literature reviews and inputs provided by various stakeholders, the sector Plan was drafted first in Nepali in line with the given format provided by the NPC and submitted to AEPC for reviews. The final draft of the Plan was prepared by incorporating inputs on the first draft.

4. Deliverables of the study

The ToR specifies that consultant will deliver the following outputs:

1. Inception/Desk Report in English languages, with study methodology and draft (tentative) content of the required inputs both in hard and electronic copy.
2. One copy of the draft document, both in Nepali and English languages, in hard and electronic copy.
3. Other documents required by NPC both in Nepali and English languages

As per the expectations specified, following were delivered:

1. Inception report,
2. Draft report in Nepali,
3. Final report in Nepali, and
4. Final report in English (See Annex 2).

5. Acknowledgements

The consultant is grateful for the opportunity given to assist AEPC and NPC in the preparation of 13th Three-Year Renewable Energy Sector Plan.

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Special thanks go to all officials who provided their valuable inputs during the study period to include the comments providers on the first draft of the Plan.

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Annexes

Annex - 1: Final Draft - 13th Three-Year Plan for Renewable Energy Sector in English

Thirteenth Plan of Renewable Energy Sector (2013/14 - 2015/16)

1. Background

Government of Nepal (GoN) has made commitments to various international and regional levels including Millennium Development Goals (MDGs), Goals of South Asian Association for Regional Cooperation (SAARC goals), sustainable development, climate change, and Sustainable Energy for All (SE4All). Besides, Nepal is heading towards upgrading its status to a developing country from a least developed country (LDC) by conducting development programme in tandem with climate change issues and by promoting green economy.

Government of Nepal (GoN) began a new initiative, with a special priority, to present alternative and renewable energy (RE) giving a separate heading in plan document since the 10th Five-Year Plan (2002/03 - 2006/07). In line with the changing and transitional country context, since 11th Plan to date three-year plans have been prepared. Similarly, since the 11th Plan alternative and renewable energy has been considered as an integral part of the nationally important infrastructure development and the current approach paper for the 13th plan also maintains the same.

About 70 per cent of households are estimated to be using electricity services from various sources. However, it is estimated that about 96 per cent of population are using electricity in cities as opposed to only 63 per cent in rural areas³. Since Nepal is mostly rural, it is clear that maximum number of households is deprived of electricity.

In areas where it is difficult to extend national grid, about 13% population has been provided with electricity service from renewable sources. In the energy mix of rural areas, the main place is occupied by biomass-based energy and imported kerosene. Since majority of rural settlements are scattered making it difficult to extend national grid, it is an imperative to provide services through development and promotion of alternative and renewable energy resources. Rural people have a compelling situation of relying on traditional energy resources and, as a result, mostly, women and girls have been taking the burden of collection and management of fuels from forest and other sources. Until now people are living in an illusion that they get firewood for free or at cheaper price from the forest and at the same time they are suffering from acute respiratory diseases. Facts suggest that the household energy mix is dominated by firewood. While more than 64% households use firewood in country, the proportion is about 74% in rural areas and 30% in cities⁴.

³ Nepal Living Standard Survey, 2010/11, p 34.

⁴ NLSS 2010/11, p34 (English), and Table 3.8, p 44.

In accordance with the assumption that the governmental and other agencies have provided high priority to the renewable energy, the government is committed to formulate national renewable energy policy, strategy and acts. Sustainable renewable energy promotion will be happen with increased internal and external supports. In line with the spirit of the Local Self Governance, local government bodies and representative agencies will have their active and effective roles in renewable energy promotion. While various stakeholders or partners will have encouraging participation along with their ownership towards renewable energy promotion, the Alternative Energy Promotion Centre (AEPC) will gradually be strengthened towards its roles in the areas coordination, regulation, technical assistance and capacity development.

2. Progress review of Three-year Plan

There is a huge gap between the existing potential enormity and present level of generation of hydroelectricity in Nepal. While the present demand for electricity is about 1,200 MW, which is increasing by 70 - 80 MW per year⁵. Not only that, during rainy season the electricity generation is just about 65 per cent of the present demand and that falls to half during dry season, as a result, general public are suffering from severe load shedding problem (cut out of the electricity supply). In 2008, the government declared electricity crisis and set targets to generate 10 thousand MW in ten years and 25 thousand MW in twenty years. However, the progress towards achieving these targets is not encouraging. In case of renewable energy, as far, about 36 MW of electricity has been generated comprising of 26.27 MW from micro-hydro, 10 MW from solar energy, 18 kW from wind energy and 43 kW from biomass energy. Likewise, 99 solar drinking water projects, 284 thousand household, institutional and community biogas, 2,272 solar dryer/cookers, 9819 improved water mill (IWM), and 753 thousand improved cook stoves (ICS) have been installed, and at the rate of 1,000 tonnes⁶ of bio-briquettes promoted. As of now, wind energy data collection and energy mapping has been completed in 9 districts and data collection is on going in 3 districts. Through revolving fund, business plans of 144 enterprises have been developed for 72 microhydro and 90% grant has been already released, and 65 enterprises are already upon running.

In all District Development Committees (DDCs), Energy and Environment Units and Sections have been established and operationalised. Ministry of Federal Affairs and Local Development (MoFALD), under the concept of "Environment Friendly Local Governance", has taken steps to make these Units or Sections as the focal point for energy, environment and climate change at the local level. Special emphasis has been given to renewable energy in line with "Sustainable Energy for All (SE4All)" initiative. While Nepal has already started receiving revenue from the Clean Development Mechanism (CDM), the microhydros have been registered as CDM projects. Similarly, ICS and IWM are also in the process of registration in the CDM. Besides by incorporating climate change and gender issues three DDC have been supported to prepare district climate and energy plan. In order to develop CDM as an integrated and long-term mechanism in Nepal and to incorporate gender issues, a Climate and Carbon Unit has been established under the Alternative Energy Promotion Centre. With these activities, livelihoods of rural, deprived and women have been enhanced

⁵ Extracted from RERL programme's project document, p5.

⁶ According to the information provided by bio-briquette promoters on the pre-consultation meeting held at the AEPC on 17 December 2013.

by increasing their access to resources. Similarly, gender equality and GESI mainstreaming have been promoted.

3. Longterm vision

In 20 years, 10% of the total energy consumption will be met from renewable energy and 30% of population having access to electricity will be provided with electricity from renewable energy. Besides, by ensuring necessary policy, institutional and economic aspects for renewable energy development and promotion and by improving livelihoods of deprived and women, contribution will be made to country's poverty alleviation.

4. Objective

To reduce dependency on traditional energy as well as to emphasize on development and promotion of alternative and renewable energy in areas where national grid cannot reach in the near future.

5. Strategy

1. Emphasis will be given to research, development and technology transfer for renewable energy and to produce necessary equipment within the country.
2. Resource will be mobilised for the development and promotion of renewable energy through internal and external sources including carbon trade.
3. Applying energy efficiency concept, research, development and management of renewable energy will be done.

6. Working policy

1. Development, promotion and extension of alternative energy will be done in rural areas, such as, micro- and small hydro, solar energy, biomass energy and wind energy. (1)
2. Essential capacity building of local bodies will be done for renewable energy planning, implementation, promotion, monitoring and evaluation related activities. (1)
3. In order to reduce consumption of firewood as household energy, promotion as well as extension of efficient biomass energy will be done, such as, biogas, ICS, gasifire, and bio-briquettes. (2)
4. Wherever feasible electricity will be generated from wind energy and in Tarai development and extension of wind energy operated pumps will be done for irrigation. (2)
5. Promotion and extension, of community and institutional biogas, energy production from dumping sites and gasifire systems, will be done. (2)
6. Promotion and extension of appropriate technologies and systems will be done for proper management and generation of energy from garbage coming from various sources. (2)

7. By collecting used battery of solar energy generation, system will be developed for re-cycling and appropriate management. (2)
8. For sustainable and appropriate development of renewable energy, by developing the existing Rural Energy Fund (REF) into a Central Renewable Energy Fund (CREF) an investment environment will be created for financial institutions. (2)
9. Appropriate policy will be prepared for bio-fuel production in the country as a partial alternative for petroleum products. (3)
10. In order to address present energy crisis, while continued supply of energy to important public institutions in cities will be made through solar energy, provision will be made to manage minimum essential energy needs from renewable energy resources for buildings that will be constructed in cities. (3)
11. Appropriate subsidy will be provided for generation and use of energy from garbage coming from city dwellers. (3)
12. Quality/standard checking system will be strengthened while importing solar panel and other renewable energy equipment. (3)

7. Quantitative targets

Within the plan period, provide electricity services to additional 8 per cent rural population through alternative and renewable energy resources.

By 2017, achieve smokeless homes throughout the country through provision of clean energy technologies. Covering all districts, install 80,000 household biogas plants, 900 community and institutional biogas plants, 50 commercial biogas plants and 10 biogas plants from municipal waste to produce energy. Install 1.2 million ICS and other biomass energy technologies (BETs). Promote 23,000 metallic ICS (rocket type, two pot hole, three pot hole and institutional). Produce and distribute 2,000 tonnes of bio-briquettes per year. Generate 100 kW equivalent of electricity from biomass energy in hill and Tarai areas.

Provide electricity services by installing 400,000 solar electricity systems in areas where electricity has not reached. Establish 8 solar mini-grid and 12 battery collection centres. Implement 200 solar drinking water and micro-irrigation projects in hilly districts. Install 1,300 institutional solar electricity systems in remote districts to run computers in schools and to run health centres. Install 2,350 solar dryers and 2,200 cookers in various districts. Besides install 100,000 city-solar electricity systems where electricity has not reached yet.

Generate 15 MW (15000 kW) electricity from micro and small hydros from potential hilly districts. Establish 5 local grids by merging micro and small hydro projects in feasible areas. Install as well as improve 2,950 water mills in the hilly districts to provide milling as well as electricity services. Conduct 9 feasibility studies to connect micro and small hydropower projects into the national grid.

Generate 1000 kW equivalent electricity from wind energy in feasible areas. For wind energy data collection install additional data logger in 30 locations and based on available data conduct energy mapping to prepare Wind Energy Atlas. Besides based on available data, carry out feasibility study for solar and wind hybrid technology in those 30 locations. On the basis of comprehensive feasibility study, generate electricity from wind and solar

hybrid technology in 20 feasible high altitude locations for rural electrification which would also involve private sector. Promote 25 wind pumps in feasible Tarai districts for irrigation.

Through RET related business, create 1,300 new enterprises and improve 2,800 existing enterprises to create additional 19,000 employments for women and men. Besides implement 15,300 income-generating activities (IGAs). By integrating climate change into RE planning and gradually developing RETs as "carbon project and programmes", achieve sustained revenue generation through carbon trade.

For the promotion of renewable energy, conduct various necessary research and studies as well as develop and implement policy, rules and laws.

8. Main programmes and priorities

Biomass energy programme

The main aim of the biomass energy programme is to enhance affordable access of low income and backward families to alternative energy as well as increase energy efficiency. In this way, in one hand, support to environment protection could be achieved by reducing pressure on forest for firewood, and on the other hand, positive contribution to climate change mitigation could be achieved by reducing greenhouse gas (GHG) emission. In line with the target of achieving smokeless homes by 2017 throughout the country through provision of clean energy technologies, massive promotion and expansion of biogas, ICS and bio-briquettes will be done. Providing financial assistance will increase access of low income and backward families. By giving priority to appropriate and smaller capacity biogas plants, in order to promote biogas in high Himalayan region, additional studies, research and cost reduction activities will be implemented. Within this plan period 80 thousand household and 900 community and institutional biogas plants will be constructed. Similarly, in line with objective of promoting ICS, 1.2 million ICS will be installed. Besides 23,000 metallic ICS (rocket type, two pot hole, three pot holes and institutional) will be promoted. Provision will be made to produce and distribute 2,000 tonnes of bio-briquettes per year. To produce and promote biofuel, policy formulation, jatropha nursery establishment, plantation, studies and research types of work will be carried out. In this way, 100 kW equivalent of electricity will be generated from biomass energy in the hills and Tarai areas. Besides, by utilising garbage produced in cities and waste products of agriculture and forest resources, pilot projects for electricity generation will be conducted and gradually that will be oriented towards promotion and expansion.

Solar energy programme

Within the plan period, by installing 400 thousand household level solar electricity systems, electricity will be supplied in rural areas where national grid has not reached as well as micro-hydros are not feasible. To minimise electricity crisis in cities, 25,000 households in the initial year and additional 75,000 households in the remaining period of the plan period will be provided with subsidies for solar electricity installation. In remote hilly areas 200 solar electricity operated pumps will be installed for drinking water and small-scale irrigation. In remote districts, 1,300 institutional solar electricity systems will be installed for running computers in community schools, for lighting and running refrigerators in health centres, for running photocopy and fax machine etc. at local levels. To address the growing demands of rural areas, 2,350 solar dryers and 2,200 solar cookers will be installed. In areas

where electricity has not reached, electricity service will be provided through 8 solar mini-grid systems. By collecting used battery of solar energy generation, re-cycling and appropriate management will be done through establishment and operationalisation of 12 collection and processing centre in line with the public-private partnership concept.

Micro and Small Hydropower programme

Within the plan period, the target is to generate 15 MW of electricity from micro and small hydropower projects which will be utilised to promote small and medium scale enterprises for creating local employment and strengthening rural economy on the top of household consumption. Consisting of improving the existing as well as installing new ones, a total of 2,950 water mills will be installed in hilly areas for milling of food grains. By merging micro-hydro plants available in rural areas 5 local grids and 1 regional grid will be developed and connected to the national grid. In order to address the problem of electricity supply in areas which are going to be municipality and hilly district headquarters, additional 10 small and micro-hydro plants will be established. If national grid reaches to the areas where micro and small hydropower projects are in running condition, 9 feasibility studies will be conducted based on which they will be connected to national grid. In 2 locations where it is not possible to have only one kind of renewable energy technology, electricity supply will be done through combination of a number of renewable energy technologies.

Wind energy programme

Since various locations in Nepal are potential of wind energy development, during the plan period the target is to generate 1000 kW electricity and to prepare Wind Energy Atlas by carrying out wind energy data collection from all over the country and energy mapping. In districts where wind information as well as wind maps exist, it is targeted to generate electricity by installing micro and small-scale wind turbines. In order to attract private sector wind energy policy will also be developed during this plan period. Besides, based on available data, feasibility study will be carried out for solar and wind hybrid technology in those 30 locations. On the basis of comprehensive feasibility study, electricity will be generated from wind and solar hybrid technology in 20 feasible high altitude locations for rural electrification that would also involve private sector. Promotion of 25 wind pumps will be done in feasible Tarai districts for irrigation.

Renewable energy's productive end-use programme

It has been realised that renewable energy and community electrification should be utilised for positive economic outcomes. Therefore, REs will be tied up with the productive activities like micro, small and medium enterprises (MSMEs) for the improving livelihoods. Similarly, REs will be utilised for lift irrigation for increasing agricultural productivity. These activities will help improve the income of people through creation of employment. Within the plan period, 19,000 additional employments for women and men will be created through 1,300 new and 2,800 upgraded businesses/professions which would be linked to RE and RETs. Besides, various income generation activities will be carried out with 15,300 households.

Institutional strengthening programme

While it has been realised that institutional strengthening is essential for renewable energy development and expansion, a number of barriers have stood up as barriers. Among others policy and institutional barriers are the key ones. Although the Rural Energy Policy (2006) proved itself to be a milestone, it has been gradually realised not sufficient, and the development activities have not taken expected momentum due to lack of necessary act, law, rules and bylaws. As the technology promotion activities have become subsidy driven, in one hand, it has caused a lack of proper ownership of RET promotion activities, and on the other hand, it has exerted pressure on the scarce public resource. Similarly, due to lack of insurance for the installed technologies there is a risk of potential loss of investment in case they fail to carry out timely repair and maintenance works, or fail to re-construct RETs or system in the event of damage. In this way, the lack of appropriate combination of grant, credit and insurance, in one hand, public resources could not be targeted to the most needy class or community, and on other hand, the market price distortions have occurred impacting on ownership and management aspects. Besides, due to lack of overall energy policy, in one hand, renewable energy and traditional energy policies are considered in an isolated manner, on other hand, there is a lack of mandatory policy for connecting the isolated smaller hydropower or solar energy systems into national grid that can lead to wastage of such smaller systems. There is also lack of policy and programmes for supporting technology synchronisation and safety for connecting to national grid.

As the institutional capacities for programme planning and implementation are not sufficiently strong, it has become difficult to implement comprehensive and integrated programmes at the local level. DDCs are the ultimate pillars for local development. However, for capacity building of the DEEU or S established under DDCs appropriately, there is a need to develop short and long-term action plans for sustainability of these Units from the managerial and financial aspects with clear vision.

The 20-year renewable energy perspective plan, national policy and acts will be operationalised. In the context of the importance of roles of other cooperating organisations, especially private sector, NGOs and local bodies, and for effective implementation of Renewable Energy Policy and programmes, improvement in institutional structures of AEPC will be pursued by developing Strategic and Organisational Development (SOD) plan during the plan period. Similarly, through an appropriate Act, AEPC will be re-constituted as the Renewable Energy Development Board (REDB). Besides, essential rules and by-laws will be formulated with emphasis on essential human resource development. Likewise, necessary steps will be taken to mainstream GESI concept from centre to local levels. In order to ensure effective participation of various organisations working in the clean cooking energy sector, under the leadership of AEPC a Nepal Alliance for Clean Cookstoves (NACC) will be mobilised. Appropriate support will be provided to various organisations involved in RE promotion for their capacity building.

Miscellaneous programmes

RE related surveys, feasibility studies, research and development (R&D), promotion, demonstration and public awareness programme, national standard determination of equipment and materials, policy and plan formulation, training, etc. activities will be implemented during the plan period. By enhancing the capacity of RE Testing Centre's capacity and by maintaining the quality standards of equipment and materials used in RETs, reliability of services and quality standard will be maintained. For integrated development of RETs, a sector-wide approach (SWAp) will be adopted. While implementation system will be oriented towards maintaining consistency, provision will also be kept for providing space for carrying out some new and innovative activities. In order to develop RET projects as CDM and carbon projects and programmes, feasibility studies will be conducted and gradually feasible technologies will be developed as carbon projects.

Consistency and effectiveness in monitoring and evaluation will be enhanced by preparing comprehensive and clear indicators based on the overall indicators included in this plan document for all levels. The indicators of renewable energy programmes will be oriented with the Poverty Monitoring and Analysis System/District Poverty Monitoring and Analysis System (PMAS/DPMAS), commitments made by the government at regional and international levels, and target of graduating from a Least Developed Country to a developing country. Besides, economic, social and environmental impact assessment of all renewable energy programmes will be carried out every two years.

Since the local or village level activities are the primary focus of the monitoring, it is a highly sensitive matter as to who-where-how the bodies from the centre to local levels are involved. Similarly, how the policy actions of the centre impact on various activities is also an equally sensitive matter. Therefore, AEPC will play directly monitoring and coordinating roles at the central level. At the local levels, necessary provisions will be made as well as steps will be taken to make DDCs and representative institutions of local bodies to become active, capable and effective in local level monitoring and evaluation. As per need, necessary steps will also be taken to undertake third party monitoring by involving multi-stakeholder.

9. Result Framework

Result	Indicators	Baseline data	Target			Means of Verification	Implementing Agency	Assumptions/ Risk
			2013-14	2014-15	2015-16			
Impact Improvement of living standards of rural community, especially women and men.	% age of poverty in rural people					National census, impact evaluation report, surveys, Nepal Living Standard Survey (NLSS)		
Outcome 1 Reduced dependency on traditional energy	% age traditional energy consumption (especially firewood)	74	72	70	68	National census, economic survey, NLSS		High priority given to renewable energy
Outputs								
1.1 Biogas plants installed for household use for cooking foods.	No.of installed biogas plants	284,000	26,000	26,000	28,000	Annual reports, economic surveys, NLSS	Alternative Energy Promotion Centre (leadership), biogas promoting companies, stove promoters, bio-briquettes producers, some donor or partner organisations	National policy and act on renewable energy are in place.
1.2 Community & institutional biogas plant installed.	No.of installed biogas plants	NA	100	300	500			
1.3 ICS installed for household use for cooking foods	No.of installed ICS	753,000	105,000	400,000	695,000			
1.4 Metallic ICS installed in high altitude areas (rocket, 1-3 pot holes & institutional types).	No of installed MICS	NA	5,000	8,000	10,000			
Outcome 2 Increased access of electricity through	% age of population with access to	13	2.5	2.5	3	National census, annual reports, NLSS,		Increase in

renewable energy	electricity					economic surveys		internal and external assistance in RE sector.
Outputs								
2.1 Generation of electricity from micro and small hydropower plants.	15 MW electricity from micro and small hydro power	26.27 MW	4.5	5	5.5	National census, annual reports, NLSS, economic surveys	Alternative Energy Promotion Centre (leadership), micro-hydro promoting companies, solar energy promoters, wind energy promoters, some donor or partner organizations.	National policy on renewable energy is in place.
2.2 Household with electricity supplied from solar energy.	No. of solar home systems installed	406,000	125,000	125,000	125,000			
2.3 Public institutions supplied with electricity from solar energy.	No. of solar energy system in public institutions, especially schools and health centres	1,307	300	400	400			
2.4 Electricity supplied from biomass energy in hill and Tarai.	100 kW electricity generation from biomass energy	NA	-	50	50			
2.5 Electricity made available from wind energy.	1,000 kW electricity generation from wind energy	NA	-	500	500			
2.6 Renewable energy-based enterprises and employment created.	No. of enterprises	2,800	300	500	500			
	No. of employment	NA	4,000	7,000	8,000			
Outcome 3								
Policy and institutional certainty for sustainable renewable energy development.	Renewable Energy Policy and 20-year perspective plan prepared.	Rural Energy Policy (2006)	Initiation of work	State of formulation and approval	State of implementation	Renewable Energy Policy and 20-year perspective plan	AEPC, Ministry of Science, Technology and Environment, and National Planning Commission	
Outputs								
3.1 Renewable Energy Policy formulation	Renewable Energy Policy and 20-year	Rural Energy Policy	Initiation	Completion of policy	Implementation	Annual reports	AEPC, Ministry of Science,	Governmental and political

accomplished.	perspective plan prepared.	(2006)		formulation, and dissemination.			Technology and Environment, and National Planning Commission	commitment remain intact
3.2 Strategic Organisation Development (SOD) work accomplished.	SOD approved.	Under consideration since 2001	Concrete decision taken towards finalisation	SOD approved and dissemination	Implementation			
3.3 Necessary institutional changes brought.	Change in the institutional structure of AEPC	-	-	-	Implementation			
3.4 Mainstreaming of GESI concept into RE sector achieved.	Data collection and plan preparation based on GESI	Positing of GESI Officers in RSCs	-	-	Implementation			

Annex - 2: List of officials consulted

Mr. Gopi Mainali, Joint Secretary/NPC
Mr. Manohari Khadka, Under Secretary/NPC
Mr. Akhanda Sharma, Under Secretary/MoSTE
Mr. Surya Kumar Sapkota, Assistant Director/AEPC
Mr. Ram Prasad Dhital, Assistant Director/AEPC
Mr. Samir Thapa, Assistant Director/AEPC
Ms. Nigma Tamrakar, Gender and Social Inclusion Advisor/AEPC/NRREP
Mr. Jagadish Khoju, Programme Manager/Community Electrification AEPC/NRREP
Mr. Prakash Aryal, Wind Energy/AEPC
Mr. Nawa Raj Dhakal, Assistant Director/AEPC
Mr. Raju Laudari, Assistant Director/AEPC
Mr. Uttam Jha, Biogas Programme AEPC/NRREP
Mr. Bibek Raj Kandel, Programme Officer/AEPC
Mr. Satish Gautam, National Programme Manager, RERL/AEPC
Mr. Bhupendra Shakya, Renewable Energy Adviser, RERL/AEPC
Dr. Mohan Wagle, PPCR/ADB
Mr. Bibek Chapagain, Norwegian Embassy
Mr. Niraj Subedi, KfW
Dr. Rabin Shrestha, WB
Mr. Vijaya Prasad Singh, UNDP
Dr. Sabita Thapa, DFID
Mr. Pushkar Manandhar, ADB
Mr. Parashuram Upadhyay, NAVIN
Mr. Hem Raj Lamichhane, ADDCN
Mr. Lumin Shrestha, CRT/N
Mr. Saroj Rai, SNV
Ms. Bidya Banmali, ICIMOD
Mr. Parbata Bhatta, AEPC
Mr. Sushil Gyawali, Biobriquette Promotor Association
Ms. Soma Dutta, Consultant
Ms. Katrine Danielsen, Consultant
Dr. Govind Nepal, Consultant