Government of Nepal
Ministry of Energy, Water Resources and Irrigation

Alternative Energy Promotion Centre

Progress at a Glance: A Year in Review
FY 2074/75 (2017/18)

Description of Photographs Used in report (in the order they appear in front of each chapter)

Chisapani Solar-Wind hybrid mini-grid of 35 kW size constructed through ADB/SASEC support (Cover Page)

A typical Rural House with Solar Home System

Alternative Energy Promotion Center Office Building

Signing Ceremony: Implementation Agreement between AEPC and GIZ for RERA program

A large biogas system at Khilung kalika, Syangja constructed through WB/SREP support

A traditionally dressed lady filling water from solar operated pumping project constructed with KFW support

Women's participation to materialize transmission and distribution of electricity from micro hydro power plant

Children carrying drinking water in water stressed rural village

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Hon'ble Barsha Man Pun 'Ananta'
Ministry for Energy, Water Resources and Irrigation

Ref. No.:

MESSAGE FROM THE CHAIRPERSON

On behalf of the Ministry of Energy, Water Resources and Irrigation (MoEWRI), it gives me an immense pleasure to extend my best wishes to Alternative Energy Promotion Center (AEPC) on the auspicious occasion of its 22nd Anniversary. At this moment, I congratulate the entire team of AEPC for their meticulous efforts and continuous devotion towards improving access to clean energy through renewable energy (RE) technologies like mini/micro hydropower, solar, wind, biogas and improved cook stoves thereby reducing dependency over traditional and imported energy especially in rural remote areas of the country.

AEPC was established on November 3, 1996 with the mandate of promoting RE technologies in rural areas of Nepal. Since its establishment, AEPC has been creating conducive environment for participation of private sector, civil society organizations and other relevant stakeholders for promotion and development of renewable energy. As a part of this process, the Government of Nepal has formulated the Rural Energy Policy 2006, Biomass Energy Strategy 2017 and various Renewable Energy Subsidy Policies to instigate and promote renewable energy technologies. Similarly, the Climate Change Policy 2011 has been prepared with the objective of reducing carbon emission while the Nationally Determined Contributions 2016 has focused on mitigating climate change by promoting renewable energy. Considering the need to further institutionalize renewable energy, the ministry has initiated drafting the Renewable Energy Promotion Bill.

I appreciate the support of development partners to the government's endeavors on renewable energy through various programmes and projects. AEPC, with support from development partners, private sector, civil society organizations and other stakeholders, has become able to generate more than 55MW of electricity, mostly in off-grid rural areas, through renewable energy resources. The contribution of renewable energy in the national energy mix currently stands at 3.2% and has been providing energy services to 18% of the rural population.

Nepal continues to prioritize renewable energy through the periodic plans, programmes and budget. The White Paper published by us emphasizes on specific initiatives such as Every Village Energy Village, Energy for Health and Education, Electric Cooking in All Households, Waste to Energy, Integration of energy and irrigation initiatives, Water-lifting and sustainable use of water resources in Terai-Madhesh and Development of smaller projects up to 1 Mega Watt capacity in each Local Government territory to be achieved through renewable energy technologies. We aim to develop AEPC as the "Center of Excellence on Renewable Energy" so that it collaborates with provincial and local governments for the development of renewable energy by exchanging knowledge, experience and expertise from home and abroad. A policy to establish a challenge fund to develop 100 to 500 kW solar energy in each local governments of the country is being formulated. In this context, AEPC should continue to deliver RE services throughout the country and also target efforts to attract private sector investment into RE.

Finally, I congratulate AEPC for completing 22 glorious years of providing valuable services to Nepali people and extend best wishes for continued success in the future too.

Barsha Man Pun 'Ananta'
Honourable Minister for Energy, Water Resources and Irrigation, and
Chairperson, Alternative Energy Promotion Development Board

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MESSAGE FROM THE SECRETARY

Alternative Energy Promotion Center (AEPC), under the Ministry of Energy, Water Resources and Irrigation (MoEWRI), is the nodal agency for the promotion of renewable energy in Nepal. AEPC has been providing clean energy services to rural people for more than two decades now and reached out to more than three million households with different renewable energy technologies and services. Renewable energy is the most locally accessible and available source of energy in remote areas which in turn contributes in reducing deforestation, reducing carbon emission and reducing imports of fossil fuels. AEPC has been contributing towards achieving the national goal for balanced regional development throughout the country by providing energy services in remote and socio-economically backward areas of the country.

AEPC has supported the installation of more than 55MW electricity generation projects through off-grid electrification solutions. The impacts on local communities in rural remote areas through dissemination and promotion of clean lighting and cooking solutions can hardly be exaggerated. Likewise, cross-sectoral applications in health, education, water lifting, public services and other productive end uses have greatly enhanced access to services for livelihood improvement of local population. However, there are still large areas still devoid of basic modern energy services. To provide transformational energy access to these 'last-mile' population is still a major challenge to the Ministry of Energy, Water Resources and Irrigation , Alternative Energy Promotion Center , in particular.

Till date, AEPC has taken the leading role for promotion and development of the renewable energy in Nepal. The need of the sector in current context is scaling up of renewable energy technologies, grid interconnection, universal access to clean cooking, sustainability of RE systems, access to finance and an integrated energy planning. For this, there is a need to improve the policy environment for technology transfer, attracting private investment and commercial financing into the sector and supporting local and provincial governments to achieve the national goal of providing modern energy access to all.

I feel happy to express my appreciation to the current achievements of AEPC and congratulate AEPC for completing 22 years of delivering services to the rural community.I extend my best wishes for all the success in days ahead.

Anup Kumar Upadhyay
Secretary, Ministry for Energy, Water Resources and Irrigation, and
Member, Alternative Energy Promotion Development Board

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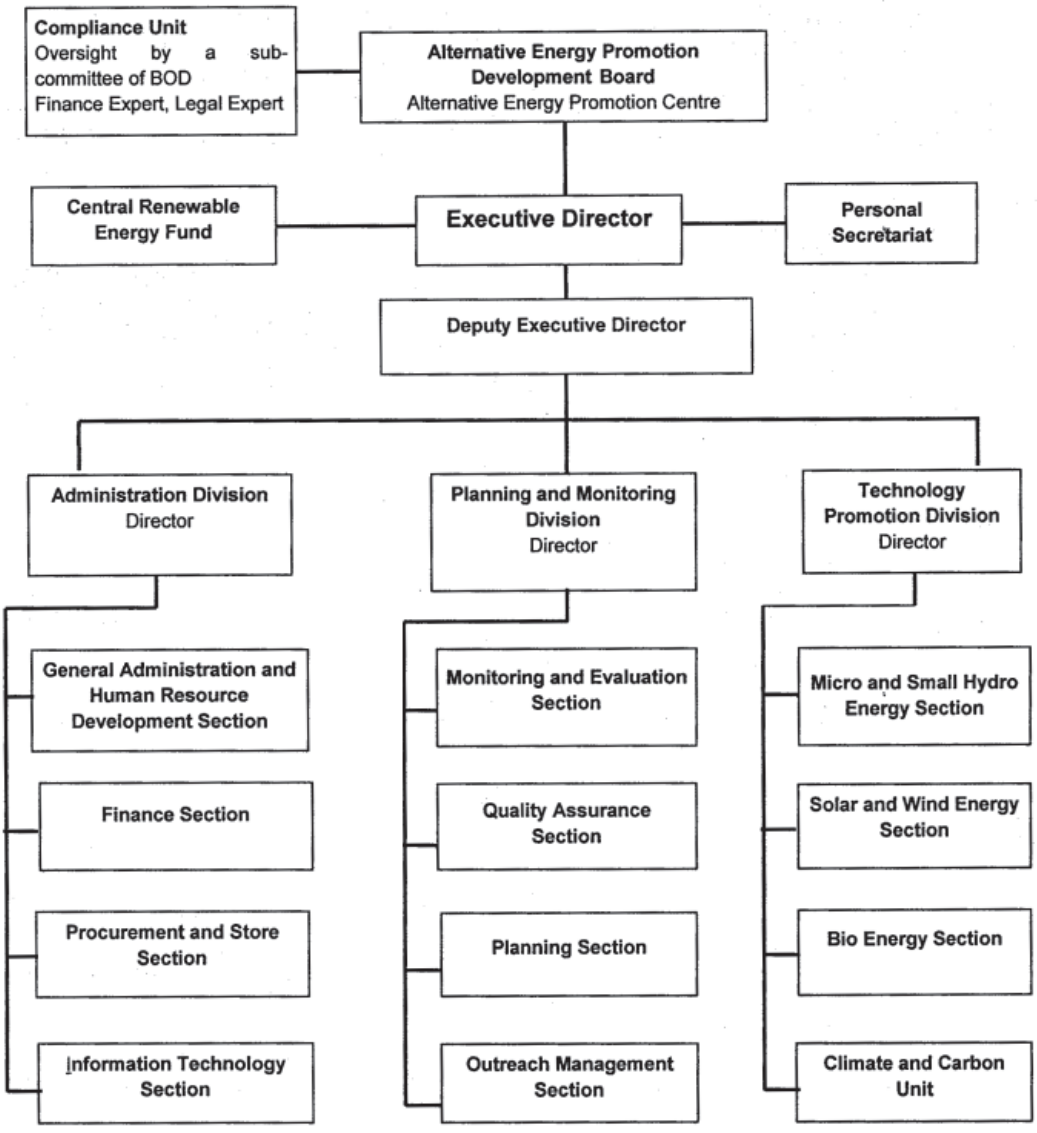
Mr. Nawa Raj Dhakal
Member Secretary
Acting Executive Director, AEPC

ORGANIZATIONAL STRUCTURE



EXECUTIVE DIRECTOR'S REPORT

Residential sector is the primary consumer of electricity in Nepal accounting 44% of the total electricity consumption where 69% population still rely on solid biomass for cooking. Energy consumption mix for the reporting period depicts the contribution of renewable energy at 3.2% of national energy consumption. Government has demonstrably recognized the importance of renewable energy in Nepal which is reflected in its periodic plans. Establishment of AEPC with the mandate to promote renewable energy in Nepal was one of the key policy outcomes of the Ninth Plan. At present, AEPC is national focal agency for renewable energy. In its journey to the 23rd year, AEPC has supported over 14 million people across country realize their renewable energy needs through mobilization of technical support, subsidy and credit. At present more than 500 private companies and 7 delivery partners are leading the service delivery front creating direct and indirect employment opportunities to over 30,000 people.

Nepal's Constitution confers its citizen with the right to reliable and affordable energy supply. The 14th plan aspires reaching additional 9% population with electricity from solar, hydro and wind resources. Similarly, the plan also aims to promote 0.2 million biogas and 1.065 million ICS. The MoEWRI White Paper, 2018 adopts a policy to establish a challenge fund to develop 100-500 kW solar energy at each local level. Similarly it focuses to develop AEPC as "Center of Excellence" in renewable energy and also has prioritized the establishment of national carbon market for renewable energy.

In 22 years of its service, AEPC has successfully executed seven major programs with support from external development partners (DPs). During the reporting period, AEPC, under the National Rural and Renewable Energy Programme (NRREP) and National Renewable Energy Framework (NREF) implemented seven different projects/programs. AEPC implemented the programs like Scaling Up Renewable Energy Programme (SREP), South Asia Sub-regional Economic Cooperation (SASEC), Renewable Energy for Rural Livelihood (RERL), Renewable Energy for Rural Area (RERA) and KfW supported program for Solar Energy Promotion. Similarly, AEPC managed the Micro Hydro Debt Fund and Biogas Credit Fund during the reporting period. These funds have been managed by AEPC since their establishment and AEPC is deliberating a gradual transfer of fund to CREF.

The reporting period was the first year after the completion of the five year

National Rural and Renewable Energy Programme (NRREP) supported by multiple DPs with Denmark and Norway as the lead DPs. After the completion of NRREP and exit of the lead donors, the government continued NRREP from its own resources and with the support from other development partners. Renewable energy program implemented in the reporting period were financed through the NRREP and special targeted programs implemented through government fund. The targeted RE Program (Government financed) achieved 94% physical progress and 96.3% financial progress. Similarly, the initiatives planned under NRREP achieved 57% physical progress and 70.26% financial progress. Electrification projects (solar and micro/mini-hydro combined) completed during the reporting period ensured access of electricity to more than 0.1 million households. Similarly, ICS and biogas technologies were instrumental in providing 55,000 households with clean cooking solutions. Improved water mills installed during the reporting period is expected to provide efficient milling services to over 4,000 households.

Besides technology promotion, AEPC clinches the elements that either compliment the renewable energy in some way or supports in delivering better services. AEPC holds eight Clean Development Mechanism (CDM) projects/programs in its portfolio. The reporting period marked a history; both, in terms of issuance of certified emission reductions and generation of financial resources through trade of the emission reductions certified. Reporting period marked issuance of around 0.64 million CERs while generating 3.69 Million USD through the transaction of the issued credits. Similarly, AEPC's accreditation application to the Green Climate Fund (GCF) as a Direct Access Entity is being assessed by the accreditation panel of the GCF. The accreditation process started in 2017, and by far AEPC is at the final stage of stage-II review after which it will be submitted for a decision by the GCF board. AEPC believes that the efforts invested in getting accreditation during the reporting period will be materialized soon.

As a part of streamlining environmental and social safeguards (ESS) in AEPC operations, AEPC adopted an ESS policy. During the reporting period, an ESS Unit has been established at AEPC. The unit conducts its activities independent to the technology promotion units ensures safeguards compliance in the projects where the safeguard requirements are triggered.

Compliance unit, established at AEPC to strengthen its internal control and system improvement completed its first full year in the monitoring period. As a part of its activity, the compliance unit completed Information Security Audit of AEPC and initiated first compliance review and audit on effectiveness of implementation of compliance and ethics functions.

Similarly, one of the key achievements associated with the outreach management was realized in the reporting period. Outreach function at AEPC supports to scale up RETs through utilization of existing institutional linkages. With the spirit of enhancing coordinated and collaborative approach at more decentralized level, AEPC established two project implementation units (PIUs) at Province-1 and Province-7 of Nepal in coordination with provincial Ministry of Physical Infrastructure and Development and with support from RERA. The PIU, in future, will be integrated in the provincial ministry and provide necessary support the provincial governments for the development and expansion of renewable energy.

Renewable energy technologies promoted during the reporting period helped in achieving 0.13 million tons of carbon dioxide equivalents The RE technologies implemented during the reporting period contributes to achieve SDG-7, SDG-13 and SDG-3. AEPC look forward to work in close collaboration with the provincial and local governments by complementing each other in deploying quality renewable energy systems and services vetted by a robust monitoring and reporting mechanism

Among others, the foundation of the organization itself has remained to be the key challenge at AEPC. With the view of organizational stability and sectoral growth, need of a stronger AEPC was equally imperative before and AEPC attempted for its establishment through an Act. In the changed governance system, this is even more pronounced. AEPC appreciates the role of the ministry in taking ownership of AEPC's agenda and look forward for the continued support from the ministry to progress further promulgating the AEPC Act.

Mr. Nawa Raj Dhakal
Acting Executive Director, AEPC

ABBREVIATION AND ACRONYMS

AEPC	Alternative Energy Promotion Centre
AEPDB	Alternative Energy Promotion Development Board
BAT	Best Available Technology
BAU	Business as Usual
BDS	Business Development Services
BMZ	German Federal Ministry for Economic Cooperation and Development
CCU	Climate and Carbon Unit
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CPA	Component Program Activity
CREF	Central Renewable Energy Fund
DAE	Direct Access Entity
DAGs	Disadvantaged Groups
DEECCS	District Environment, Energy and Climate Change Section
DOE	Designated Operational Entity
DP	Development Partners
EDP	External Development Partners
EIA	Environmental Impact Assessment
ESS	Environmental and Social Safeguards
FY	Fiscal Year
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gas
GIS	Geographic Information System
GoN	Government of Nepal
ICS	Improved Cooking Stoves
IEE	Initial Environmental Examination
IGA	Income Generating Activities
ISPS	Institutional Solar Photovoltaic System
IWM	Improved Water Mills

KfW	German Development Bank
kW	Kilowatt
kWh	Kilowatt Hour
LFI	Local Financial Institutions
LPG	Liquified Petroleum Gas
MHDF	Miccro Hydro Debt Fund
MHP	Micro Hydro Projects
MICS	Metallic Improved Cooking Stoves
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoF	Ministry of Finance
MSME	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
MW	Megawatt
NAMA	Nationally Appropriate Mitigation Action
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NEA	Nepal Electricity Authority
NGO	Non-Government Organizations
NPC	National Planning Commission
NPR	Nepalese Rupees
NREF	National Renewable Energy Framework
NRREP	National Rural and Renewable Energy Program
PEU	Productive Energy Use
PIN	Project Idea Note
PoA	Program of Activities
PPP	Public Private Partnership
PVPS	Photovoltaic Pumping Systems
RA	Reverse Auctioning
RE	Renewable Energy
REF	Rural Energy Fund
RERA	Renewable Energy for Rural Areas
RERL	Renewable Energy for Rural Livelihood
RET	Renewable Energy Technology
RSC	Regional Service Centre
RTSP	Regional Technical Service Provider

SAMS	Subsidy Administration Management System
SASEC	South Asia Sub-regional Economic Cooperation
SDG	Sustainable Development Goals
SIA	Strategic Impact Assessment
SOP	Standard Operating Procedure
SREP	Scaling Up Renewable Energy Program
TWh	Terra Watt Hour
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USD	United State Dollars
WECS	Water and Energy Commission Secretariat

TABLE OF CONTENT

CHAPTER 1: ENERGY SECTOR OVERVIEW

1.1 THE CONTEXT

Energy plays a crucial role as a global commodity and as a cornerstone of socio-economic development. Considering the contribution of energy in economy and overall wellbeing of society, access to clean and affordable energy has remained to be the key topic of discussion. Global energy scenario depicts a significant supply from the conventional sources with more than 81% of the global energy supply contributed by the Oil, Coal and Natural Gas in 2017. Despite the fact that global decline is witnessed in a fossil fuel intensive energy production (94.55% in 1970 and 80.04% in 2015); in 2017, contribution of renewables in global energy mix stood at 1.64% (World Energy Outlook, 2017). This suggests that there are still avenues to decouple energy production from conventional sources.

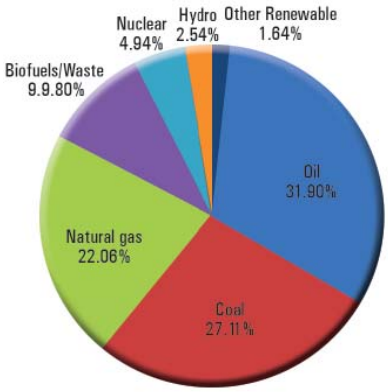


Figure 1: Global energy supply scenario, 2017

Global electricity consumption from 2000 to 2013 has increased almost by 1.5 times (12,116 TWh to 19, 504 TWh)[1] while the access to grid electricity increased to 85.19% from 77.29% in 2000[2]. It is noteworthy that the more than a billion people around the world are yet to get connected with modern energy services supplied through grid.

Nepal's National energy demand and supply scenario depicts a gap in energy demand and supply that led to the electricity outage. Since energy is fundamental to propel National economy and overall socio-economic development, situation of under supply or a "suppressed demand" leads to a compromise. Therefore, careful planning and deployment of efforts and resources are critical to narrow the gap in future. Nepal's electricity demand projection based on total population (29 million) and gross domestic product (GDP) growth rate of 4.5% (the Business-as-Usual Scenario) for 2040 stands at 1536 kWh. At current GDP growth rate of 4.5% and with reference year of 2015, annual electricity forecast for 2020 is expected to roughly double (from 158 kWh to 271 kWh Percapita). The projection of per capita electricity consumption in the Business-as-Usual (BAU) scenario from 2015 to 2040 is presented in figure 2[3]. This projection demands enhanced generation of electricity through all available means.

1 https://www.cia.gov/library/publications/the-world - factbook/fields/2236.html#xx (retrieved on Oct 22, 2018)

2 https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?view=chart (retrieved on Oct 22, 2018)

3 Water and Energy Commission Secretariat (WECS), 2017: Electricity Demand Forecast Report (2015-2040).

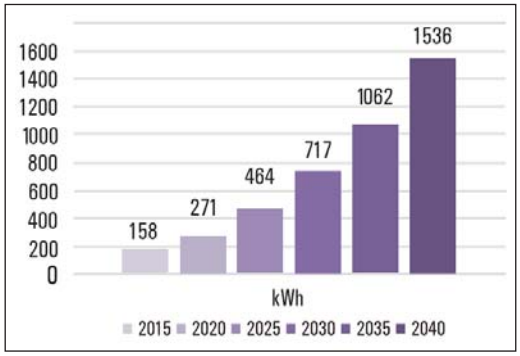


Figure 2: Projection of Energy Consumption for 2015-2040, (adapted from WECS, 2017)

1.2 NATIONAL ENERGY CONSUMPTION SCENARIO

Residential sector (households) is the primary consumer of electricity in Nepal. Household electricity consumption stood at 44.0% in the first eight months of the FY 2017/18 followed by Industrial sector (37.1%). Statistics reveal that the households in the country have more affinity towards solid fuels as primary fuel for cooking followed by the use of Liquified Petroleum Gas (LPG). Usage of LPG is in increasing trend during the last few years not only in the urban households and commercial sector, but also in rural areas. However, household's heavy reliance on traditional energy sources (solid fuels) remains unchanged with around 69% population still relying on solid biomass for cooking. Energy consumption mix for the FY 2017/18 depicts high dominance of traditional fuels (68.9%). Figure 3 presents the energy consumption scenario by fuel type in first 8 months of FY 2017/18 (MoF, 2018).

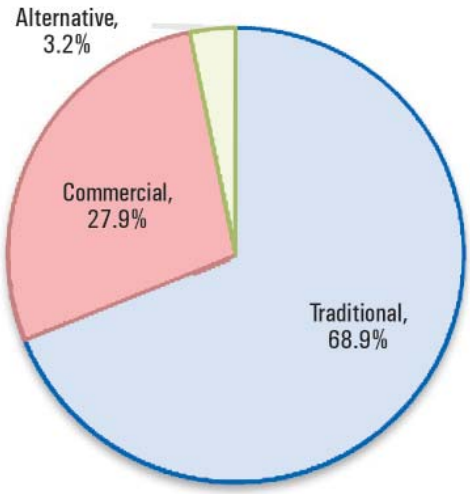


Figure 3: Energy Consumption by Fuel type 2017/18 (first eight months)

1.3 SECTORAL EVOLUTION

The seventh plan (1985-1990) embraced alternative energy in the national planning framework and adopted the policy to encourage alternative sources of energy; especially the biogas, solar and wind. Similarly, the plan also adopted the policy to promote improved cooking stoves (ICS), small water turbines and the improved water mills (IWM). In order to realize the policy targets, the plan adopted working policy of engaging private sector and providing the consumers with grant or loan for effective promotion of such technologies. The plan equally emphasized on the research and studies, and on developing technical manpower. Subsidy was first introduced during this plan for the technology (biogas, ICS, IWM and small turbines) and research and training.

The eighth plan (1990-1995) marks as the first plan of the democratic government of Nepal after restoration of democracy in 1990. The plan continued with the alternative energy agenda adopted by the previous plan and realized the need to set up an alternative energy agency to implement and coordinate different energy related programs. The plan emphasized rural electrification and electricity from micro-hydro projects as a means to achieve it and institutionalized set up for development of micro-hydro projects, biogas energy, solar energy, wind energy and biomass energy. The plan envisioned that the alternative energy development program be implemented through efforts of the private sector. The program was envisioned for implementation with necessary collaboration between the Agricultural Development Bank, other financial institution, private sector and non-government organizations. The plan continued with the allocation of government budget in alternative energy sector.

By the Ninth Plan (1995-2000), development of rural energy was recognized as a means to increase employment opportunity with the aim to develop economic foundations, enhance rural living standard and maintain environmental sustainability. The plan adopted a policy to engage private sector, national and international non-government organizations in research and development of rural and alternative energy technologies. Similarly, the plan institutionalized Alternative Energy Promotion Centre (AEPC) to collect and update data related to alternative energy technologies. The plan especially emphasized on expansion and promotion of ICS, micro hydro, solar and other isolated renewable energy technologies. In the meantime, the plan also conceptualized the decentralized energy planning and adopted a policy to institutionalize AEPC as the focal agency for promotion of alternative energy in Nepal. The plan also sought to attract private sector and grid interconnection of the rural alternative energy systems.

The tenth plan (2002-2007) came up with the quantitative targets for the deployment of renewable energy technologies and adopted long term vision of accelerating economic development, increasing employment opportunities and maintaining environmental sustainability. Similarly, the plan also envisioned to commercialize alternative energy technologies and replace the traditional forms of energy with modern energy sources. As a strategy to propel the adopted vision and target more effectively, the plan envisioned to create a Rural Energy Fund (REF) which would ultimately be propagated to district and village levels. Separate programs for promotion of biogas, solar energy, micro-hydro, wind energy and bio-energy were planned for effective implementation of the targets set.

By the time the Three Year Interim Plan (2007-2010) was formulated renewable energy sector had

attained necessary institutional, organizational and execution framework for its implementation in Nepal. The plan continued setting up sectoral targets for different renewable energy technologies. In addition to the long term vision established by preceding periodic plans, this plan kept the vision to generate financial resources through development of the renewable energy technologies as Clean Development Mechanism (CDM) projects banking on the potential of the renewable energy technologies in reducing greenhouse gas emissions. Similarly, gender and social inclusion through increased participation of women and population of all caste and class in the process of promotion and utilization of renewable energy resources was envisioned. The plan focused on expansion of technologies as a means to improve energy access, livelihood, investment leverage from non-state actors and access to information. More importantly, Central Renewable Energy Fund (CREF) was conceptualized for establishment for effective and sustainable development of rural energy.

The three Year Plan (2010-2013) adopted a long term vision of ensuring 10% contribution of renewable energy in the energy mix such that 30% penetration is achieved among the population with access to electricity. Technology specific programs adopted by previous plans were continued with the strategy to promote and expand off-grid renewable energy systems. The plan also adopted the strategy to implement integrated programs targeting overall economic and social development and environmental sustainability, sectoral coordination, and research and technology transfer. The plan adopted policies to serve urban population, through promotion of urban solar and waste to energy projects targeted at commercial and municipal scale. Similarly, institutionalization of the CREF, promotion of renewable energy based enterprise and grid interconnection of the renewable energy projects were among the key policy introductions in the plan.

The Thirteenth Plan (2013-2016) adopted the strategy of research and development, and technology transfer of renewable energy technologies, mobilization of internal and external resources including those from carbon revenue and research, development and management of energy efficiency measures in renewable energy technologies. The plan, among others, aspired capacitating local bodies plan, implement, monitor and evaluate the renewable energy related activities. Similarly, the plan also adopted policy to operationalize CREF, manage the used batteries generated from solar based technologies and use solar and wind technologies for the purpose of water pumping.

1.4 PREVAILING POLICY AND LEGAL FRAMEWORK

The Constitution of Nepal (2015) ensures that the government will take the policies relating to

protection, promotion and use of natural resources (Part 4 Article 51 g). The constitution directed that the government will take the policy to ensure reliable supply of energy in an affordable and easy manner, and make proper use of energy, for the fulfillment of the basic needs of citizens, by generating and developing renewable energy[4]. This has mandated the government to develop and implement the policies and strategies related to renewable energy promotion in the country.

Rural Energy Policy, 2006 Focused on the reduce dependency on traditional energy and conserve environment by increasing access to clean and cost effective energy in the rural area. Increase the living standards of rural people by creating employment and productivity through the development of rural energy resources.

Climate Change Policy 2011 of Nepal has the objective to reduce GHG emissions by promoting the use of clean energy, such as hydro-electricity, renewable and alternative energies, and by increasing energy efficiency and encouraging the use of green technology. The policy has also emphasize to adopt the low carbon climate resilient path by reducing GHG emissions through additional development and utilization of clean, renewable and alternative energy technologies and formulating and implementing plans to address adverse impacts of climate change.

RE Subsidy Policy and Subsidy Delivery mechanism (2016), Focused on the utilization of Best Available Technology (BAT) and Reverse Auctioning (RA) in the promotion and installation of RE technology. Reduction and re-adjustment of the subsidy amount in the RE technology to make the gradual shift from Subsidy to credit model. Provision of the competent companies for the installment of RETs. Consumption based subsidy in electrification technologies.

Nationally Determined Contribution (NDC), 2016 of Nepal has also focused on the promotion of renewable energy and energy efficiency for the adaptation and mitigation of climate change.

Fourteenth periodic plan. Since the fiscal year 2015/16, the GoN has adopted the fourteenth plan. The plan aspires to reach additional 9% of population with electricity from solar, hydro (mini and micro) and wind resources. The 14th plan also aims to promote 0.2 million units of biogas digester and 1.065 million units of improved cooking stoves (NPC, 2016)[5].

Biomass Energy Strategy 2017, Promote the biomass energy as reliable, affordable and sustainable energy resource to address the increasing energy demand of Nepal. Increasing production of sustainable biomass energy by utilizing agriculture, forest residues and organic wastes hence contributing access to clean cooking solutions. Increasing the effectiveness and efficiency of utilization and

4 The Constitution of Nepal (2015)

5 National Planning Commission (NPC), 2016: The Fourteenth Plan (2016/17-2018/19)

production of Biomass energy are key features.

National Renewable Energy Framework (2017), Aims to converge initiatives of GoN, DPs and other organisations behind a common over-arching vision delivered through an integrated results framework. Enhancement of policy and institutional coherence and harmonization of DPs and the federal, provincial and local government efforts. Acceleration of the transition from a subsidy-centred to a credit-focused model, together with smart subsidy provisions. Building and operationalizing of systems to improve Nepal's access to and utilisation of International technical assistance and finance are major features.

The Nepal Government's budget for FY 2017/18 has also focused on the renewable energy promotion to the poor, disadvantaged, Mushahars, Haliya, Doms, Dalits including the marginalized communities under Smoke Free Lighted House program and domestic biogas plants. Similarly, it has given the focus to Solar Pump Installation program for irrigation purpose, renewable energy for birthing Centres, snake bite treatment Centres, health Centres and government or community hospitals.

The white paper of Ministry of Energy, Water Resources and Irrigation (2018)[6] presents the scenario of the renewable energy in Nepal. Above 55 MW of the electricity has been produced by the renewable energy serving 3.6 million households. The white paper has provisioned the policy to establish the challenge fund to develop the 100 to 500 kW solar energy in each local level. The white paper also focuses to develop AEPC as "Centre for Excellence" in renewable energy sector. Priority has also be given to establish national carbon market for renewable energy.

6 White paper of Ministry of Energy, Water Resources and Irrigation


ALTERNATIVE ENERGY PROMOTION CENTRE

CHAPTER 2: ALTERNATIVE ENERGY PROMOTION CENTRE

2.1 ESTABLISHMENT

The positive role of RETs for the fulfillment of energy needs of rural people was recognized by the Government of Nepal as early as 1980's in the Seventh Five Year Plan. Since then, the promotion and development of RETs has gained momentum by integrating them in development plans and programmes. Alternative Energy Promotion Centre (AEPC) was established on November 3, 1996 by the Government of Nepal with the objective of developing and promoting renewable energy technologies in the country. Currently under the Ministry of Energy, Water Resources and Irrigation, AEPC is a semi-autonomous government body governed by the Alternative Energy Promotion Development Board (AEPDB) represented by members from the government, private sector, non-governmental organizations and financial institutions. AEPC's Board is the supreme body for the overall management of activities planned and implemented by AEPC.

2.1.1 Mandate

The mandate of AEPC includes the promotion of micro/mini hydro up to 10 MW, solar energy, wind energy, biomass energy, biogenetic gas, sulfur spring including biogas.

2.1.2 Vision Statement

An institution recognized as a regional/international example of promoting large-scale use of renewable energy sustainable and a national focal point for resource mobilization. The focus is to make AEPC recognized as an active institution promoting RETs in the region.

2.1.3 Mission Statement

To make renewable energy mainstream resource through increased access, knowledge and adaptability contributing for the improved living conditions of people in Nepal.

2.1.4 Strategic Objectives

The main objectives of the AEPC are as follows:

- To popularize and promote the use of alternative/renewable energy technology.
- To raise the living standard of the rural people.
- To protect the environment.
- To develop the commercially viable alternative energy industries in the country.

2.2 AEPC's WORKING APPROACH

2.2.1 Working Modality

AEPC follows the Public Private Partnership (PPP) Model and Demand Based Approach. The public sector works for the capacity building, technical and financial assistance, coordination, quality

assurance etc. and the private sector works for manufacturing, supply and installation, and after-sales services. AEPC supported to institutionalize renewable energy and climate change agenda at decentralized level through establishing District Environment, Energy and Climate Change Sections. After the promulgation of the new constitution and state restructuring into the federal system, AEPC is putting efforts to establish provincial setups (7 provinces) and local setups (753 local governments). Similarly, AEPC executed programs have been succeeding in service delivery through partnership with the national/regional level Non-Government Organizations (NGOs). AEPC engages with private sector for manufacturing, supply, installation and after sales services of different renewable energy technologies.

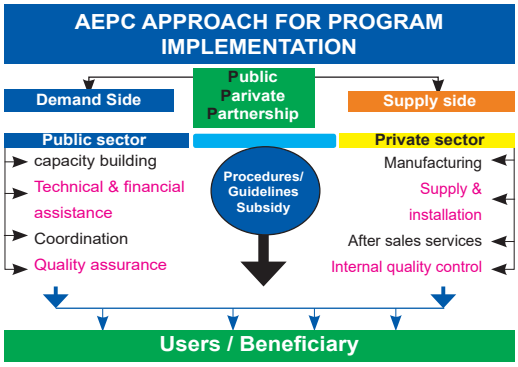


Figure 4: PPP Model of Renewable Energy Service Delivery

At national level AEPC works closely with related ministries, their departments, non-governmental organizations, private sector, civil society, national banking institutions, academic institutions and community/ users groups for the development and promotion of RETs in the country. During two decades of its successful operation, AEPC has maintained working relations with a range of External Development Partners (EDPs), Intergovernmental organizations, multilateral banks etc.

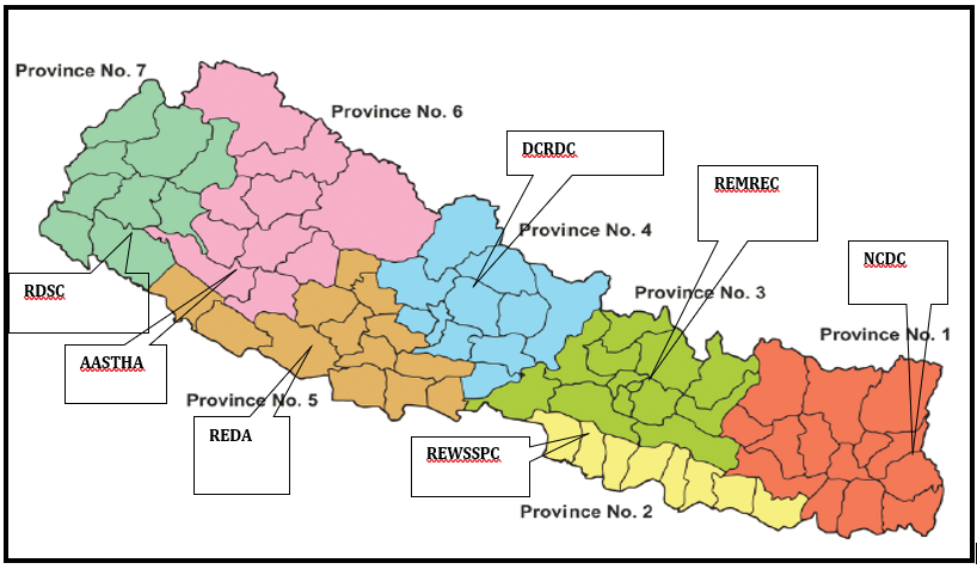


Figure 5 : Coverage of Regional Technical Service Provider

2.2.2 Promotion of Renewable Energy

Presently, AEPC is implementing different programs and projects to promote the following renewable energy systems in the country:

- Mini and Micro Hydropower,
- Improved Water Mill;
- Solar Photovoltaic and Solar Thermal;
- Biogas;
- Biomass and Bio-fuels;
- Wind Energy,

In addition to these, AEPC has promoted RETs under carbon project (basically Clean Development Mechanisms). Biogas, Micro-hydro, Improved Water Mills and Improved Cook-stoves are already under the portfolio of CDM. AEPC is gradually planning to develop all RETs under different carbon portfolio.

2.2.3 Promotion of Productive Energy Use

Productive energy use (PEU) promotion seeks to enable the translation of Renewable Energy (RE) provision into positive economic outcomes for Micro, Small and Medium Enterprises (MSMEs). Those positive outcomes (i.e. increase in product outputs, improved product quality and increased productivity) will result in income generation growth for MSMEs and contribute to poverty reduction in rural areas of Nepal. Hence, AEPC seeks to promote productive energy use of RE in order to generate employment and income of the rural men and women by establishing MSMEs.

2.2.4 Financing Instruments and Mechanism

The crux of AEPC's operation has been on the subsidy administration of different RETs. The Central Renewable Energy Fund (CREF) was established at arm's length of AEPC as financial mechanism to finance RETs. Overall guiding principle for the establishment of CREF was for the gradual phase out of subsidies for promotion of RET and its replacement by credit facilities and that the management of such credit facilities shall be handled by private sector. The main objective of CREF is, as the core financial mechanism, to be responsible for the effective delivery of subsidies and credits to the renewable energy sector.

The CREF Financial Mechanism is implemented through private commercial and development banks selected on a transparent and competitive basis in accordance with well-defined eligibility criteria.

The Handling Bank is responsible for managing the core functions of CREF i.e. wholesale lending to qualified Partner Banks; Subsidy Fund Management; and Investment Management. A number of qualified Partner Banks, the second-tier financial institutions are responsible for the retailing of CREF funds to eligible projects in the renewable energy sector. In order to enhance the outreach, the banks are required to form strategic alliances with local financial institutions (LFI). The selected banks take the credit risks, which will be reflected in the interest spreads, and as such they are also

responsible for loan appraisal and supervision. CREF, through the Secretariat, assist the banks with capacity building in order to increase outreach, efficiency, infrastructure and stability of the financial systems for lending to the renewable energy sector. The implementation arrangement of CREF mechanism is given in figure 6.

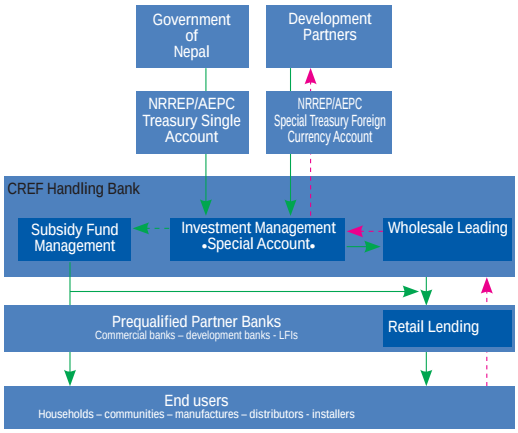


Figure 6 : CREF Implementation Arrangement

2.3 HUMAN RESOURCES

AEPC holds wide variety of human resource to implement the activities mandated to it. Currently AEPC has 54 permanent positions for different staffs. Apart from the in-house pool of staffs, it employs a pool of experts in renewable energy, environmental safeguard, social safeguard, gender equality and climate change through different projects/programs it implements.

2.4 SECTORAL POLICIES

Since its establishment, AEPC has been established as a proactive institution planning and delivering renewable energy services to targeted beneficiaries. In addition to the mandate it has received, AEPC has remained in the forefront supporting government to formulate necessary plans, policies and strategies required to mainstream renewable energy in energy supply in Nepal as a whole. Moreover, AEPC supported the line ministries it was aligned with providing inputs in the domain of climate change, different yet closely related sector to renewable energy. The key policy and strategic inputs provided by AEPC to the government include:

- Rural Energy Policy, 2006
- 14th Three Year Plan
- Renewable Energy Subsidy Policy, 2016
- Renewable Energy Subsidy Delivery Mechanism, 2016
- Biomass Energy Strategy, 2017
- National Renewable Energy Framework, 2017
- White Paper of Ministry of Energy, Water Resources and Irrigation, 2018
- Renewable Energy Policy (Draft), 2014
- Low Carbon Economic Development Strategy (Draft), 2014

AEPC has ably promoted renewable energy across all available technological measures, both in the rural and urban areas. In over 22 years of its establishment AEPC has supported over 14 million people across the country realize their renewable energy needs through appropriate deployment of the technical support, subsidy and credit financing. This has led to creation of renewable energy market and

more importantly this market has penetrated the entire country. The sector has witnessed competitiveness with about 500 private companies and 8 delivery partners leading in service delivery front creating direct and indirect employment opportunities to over 30,000 people. The figure 7 depicts the number of beneficiary population served by the renewable energy technologies promoted by AEPC since its establishment.

Table 1: Cumulative achievement in technology promotion

Program	Unit	Achievements till FY 2017/18
Mud Improved Cooking Stoves (ICS)	Nos.	1,423,242
Solar Home System	Nos.	850,643
Domestic Biogas	Nos.	416,060
Micro/Mini Hydro	KW	30,706
Institutional Solar PV System	Nos.	1,752
Metallic ICS	Nos.	55,892
Improved Water Mill (IWM)	Nos.	10,857
Urban Solar Home System	Nos.	21,144
Solar Drinking Water and Irrigation Pump	Nos.	486
Solar/Wind Min-grid System	KW	413
Large Biogas Plant	Nos.	189

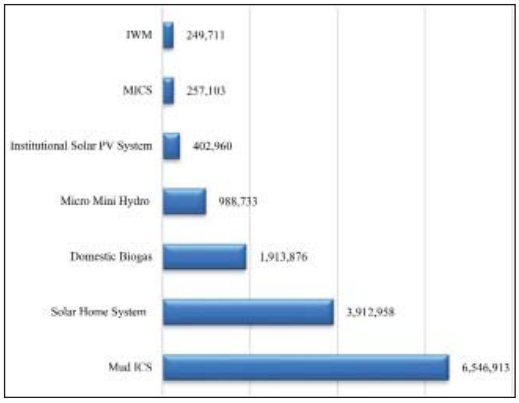


Figure 7 : Technology wise RE beneficiary population

In its quest to deliver renewable energy services to the people, AEPC has maintained its trust with key EDPs. AEPC has successfully implemented seven projects and programs (table 2) with support from the Government and EDPs, and it has maintained collaboration with the IDPs ever since its establishment. Efforts of AEPC has been recognized and it has received several felicitations and awards.

Table 2 : AEPC implemented projects and programs

SN	Project/ Program	Period	EDP Involved	Project Size (USD)
1	Rural Energy Development Programme (REDP)- Phase I, II & III	1996-2011	UNDP, World Bank	33 Million
2	Biogas Support Programme (BSP)- Phase III, IV & V	1997-2012	KfW, SNV	21 Million
3	Energy Sector Assistance Programme (ESAP)- Phase I&II	1999-2012	Denmark, Norway, KfW, DFID	84 Million
4	Renewable Energy Project (REP)	2004-2012	EU	16 Million
5	Climate and Carbon Programme- Phase I & II	2010-2014	DFID, SNV	1.54 Million
6	Kabeli Transmission-REES	2011-2016	World Bank	1.2 Million
7	National Rural and Renewable Energy Programme (NRREP)	2012-2017	Denmark, Norway, WB, ADB, UNDP, UNCDF, SNV, GIZ, UNESCAP, DFID, KfW	171 Million

CHAPTER 3: PROGRAMS AND PROJECTS

AEPC implemented various programs & projects during the reporting period. Activities were also implemented with the sole funding from the GoN's budget for the targeted RE programs. This section highlights various programs/projects implemented by AEPC during the reporting period.

3.1 SPECIAL AND TARGETED RE PROGRAM

AEPC implemented regular renewable energy promotion activities through the use of government funds during the reporting period. AEPC successfully accomplished in providing renewable energy services to the earthquake victims, biogas for DAGs, Energy for health and education, energy for irrigation and agriculture, and renewable energy for tourism.

3.2 NATIONAL RURAL AND RENEWABLE ENERGY PROGRAM (NRREP)

National Rural and Renewable Energy Program (NRREP) was a national framework program that brought together the efforts of the GoN and development partners to promote renewable energy in Nepal. Through NRREP, five governments, two multilateral banks and three intergovernmental organizations synthesized their resources equivalent to USD 171 Million for the renewable energy promotion for five years (2012- 2017).

The development objective of the NRREP was to improve the living standards of rural women and men, increase employment of women and men as well as productivity, reduce dependency on traditional energy and attain sustainable development through integration of alternative energy with the socioeconomic activities of women and men in rural communities. NRREP targeted to reach rural men and women through intervention of an array of renewable energy technologies exploiting the solar, hydro and biomass based resources.

After the conclusion of the NRREP, the GoN continued its efforts for the development of renewable energy sector through introduction of National Renewable Energy Framework (NREF). The framework allows development partners and other organizations behind a common vision join hands with the government to deliver the renewable energy services through integrated results framework. NREF aims to coordinate and track results of various RE initiatives, engage stakeholders and help mobilize finance.

DFID/UK and MoF/GoN signed MoU on 24th May 2017 for implementation of Climate Smart Development Programme (CSDP). This program has renewable energy component with £ 18 million funding from DFID to be implemented through AEPC. AEPC and CREF strategies have been prepared under

this initiative. This program will further support the implementation of NREF, once it comes into full fledged implementation.

The government has continued NRREP from its own resources and other development partners. The follow-up NRREP program under the NREF owns and builds on the key elements of the NRREP program implemented from 2012-2017 on the operationalization of the CREF, technology promotion through Technical Components and activities related to Productive Energy Use.

(i) **Central Renewable Energy Fund (CREF):** CREF has been established as a financial intermediation mechanism that mobilizes subsidies and credits in renewable energy through a set of banking and financial institutions.

(ii) **Technical Components:** Technical established in AEPC offer quality technical support services to deliver better quality services through various renewable energy technologies to remote rural households, enterprises and communities from all social groups leading to a more equitable economic growth. Other cross-cutting section/ units include Climate and Carbon, Gender and Social Inclusion (GESI), Outreach management, communication & IT, Procurement, Institutional Development and Monitoring and Quality Assurance.

(iii) **Business Development for Renewable Energy and Productive Energy Use Component (PEU):** Productive Energy Use component focuses on the optimum utilization of the energy produced from the renewable energy technologies to an increase income and generate local employment through promotion of micro, small and medium sized enterprises, particularly for beneficiaries belonging to socially and economically disadvantaged groups. This component targets at ensuring sustainability of the renewable energy systems promoted by AEPC.

The PEU component formulated broad range of activities that contributed to increase the income potential of households and MSMEs in rural areas by removing some of the main barriers to private sector development. Existing MSMEs with potentials to use RE productively are strengthened to increase their productivity and income through technical and entrepreneurial skills training and facilitated access to financial services. To improve the marketability of MSME products, PEU activities facilitated the outreach of appropriate business development services (BDS) to rural areas and enhance market linkages.

3.3 MAJOR PROGRAMS/ PROJECTS IMPLEMENTED UNDER NRREP

3.3.1 Scaling Up Renewable Energy Program (SREP)

The World Bank under Scaling up Renewable Energy Program (SREP) has been supporting AEPC to develop

market for large scale Commercial Biogas and Municipal Solid Waste (MSW) to energy projects in Nepal. The total grant amount of SREP under Extended Biogas Program was 7.9 million USD. SREP was expected to contribute on achieving NRREP targets of large biogas plants especially commercial biogas plants and waste to energy projects. SREP funding was provided to reimburse AEPC's contribution after the verified operation of the plant for a designed capacity.

3.3.2 South Asia Sub-regional Economic Cooperation (SASEC)

SASEC Power System Expansion Project has two components; first, the national grid expansion which is implemented by Nepal Electricity Authority (NEA) and next, the off-grid renewable energy based electrification through isolated mini-grid systems, implemented by AEPC. The component implemented by AEPC compliments NRREP's outputs related to community electrification. Under SASEC, the renewable energy projects are implemented in off-grid areas to enhance access to renewable energy services. The project targets to support 4.3 MW Mini-hydro and 500 kW capacity solar or/and solar-wind hybrid mini grid projects. Under capacity development technical assistance (CDTA), feasibility study of a large scal wind farm (minimum 1MW) is being carried out by installing 5 wind masts in candidate sites. Based on measured one year wind data, the CDTA will support to develop a feasibility study for grid connected wind farm, and recommend a proper tariff structure.

3.3.3 Renewable Energy for Rural Livelihood (RERL) Project

The Renewable Energy for Rural Livelihood (RERL) Programme is implemented since 2014. The total budget of the programme is USD 5 million, consisting USD 3 million from Global Environment Facility (GEF) as a part of its Climate Mitigation Portfolio and remaining USD 2 million from the United Nations Development Programme (UNDP). The UNDP-GEF RERL programme is an integral part of NRREP that has been providing technical assistance in Large Micro Hydro, Mini Hydro, Large Solar PV, Productive Energy Use and support to CREF. RERL aims at the following:

- Strengthen renewable energy institutions primarily the AEPC at the centre and DEECCS at the district level removing barriers to successful deployment of renewable energy technologies and services.
- Enhance the renewable energy related policy and regulatory framework.
- Improve access to financing by providing subsidy supports to the community based micro hydro schemes.
- Promoting sustainable livelihoods by establishing energy based micro enterprises.

- Supports to internalize lessons learnt and best practices to formulate and implement rural/ renewable energy policies and regulations at the central level.

3.3.4 KfW Supported Program for Promotion of Solar Energy

The German development bank (KfW) committed an amount of 5.7 million euros for the promotion of Institutional Solar Photovoltaic Systems (ISPS) and Photovoltaic Pumping Systems (PVPS) for drinking water in rural areas of Nepal. This aims for implementation of 185 ISPS on schools, 185 ISPS on health posts and 188 PVPS for drinking water. This program is also supporting for used lead acid battery management, and quality assurance mechanism for RETS. This project is carried out by the Alternative Energy Promotion Centre (AEPC) as executing agency under the framework of the National Rural Renewable Energy Programme (NRREP).

3.3.5 Renewable Energy for Rural Areas (RERA)

The Renewable Energy for Rural Areas (RERA) is a joint technical support program for the Nepalese small-scale renewable energy sector of the Government of Nepal (GoN) and the German Federal Ministry for Economic Cooperation and Development (BMZ). The program is jointly implemented by the Alternative Energy Promotion Centre (AEPC) and Deutsche GIZ. For the German contribution BMZ provides EUR 5 million, while the Government of Nepal committed the budget of its own in order to ensure its smooth implementation.

The over-arching vision for RERA is 'to ensure efficient and effective service delivery of small-scale renewable energy through improved outreach and enhanced local cooperation in a federalized and decentralized Nepal'. This vision will be delivered through improving and developing a framework for participatory and demand-led promotion of small-scale renewable energy in federal, provincial, and local government authorities, ensuring the effective cooperation with civil society and the private sector in the context of federalization and constitutional reform. Amongst other measures, RERA aims to do this by helping AEPC in its transition to a more decentralized service delivery and supporting the setting up and operationalization of 2 program implementation units (PIU) (one in the West and one in the East Nepal). The program will also support local governments, Provincial governments and potentially federal government, work together with civil society, the private and banking sector to improve service delivery of small-scale renewable energy.

The implementation of RERA program went well during the first financial agreement period through effective delivery of planned activities. However, the continuation of the same in the days to come will help AEPC and RERA to meet the

project goal and objectives timely and effectively. Thus the extension of the financial agreement for the current Nepali fiscal year will further contribute to meet the vision of program.

The program is divided into four components:

1. Supporting central government institutions to help them prepare for decentralized energy service delivery
2. Supporting AEPC in establishing a decentralized outreach structure so that they are enabled to implement support program in collaboration with local and central government structures,
3. Promoting local energy service delivery through effective institutional engagement with local governments, civil society, private and banking sector,
4. Involving disadvantaged groups (DAGs) and women to ensure their engagement in the energy service delivery as decision maker, implementers and beneficiaries,

3.3.6 Micro Hydro Debt Fund

Micro Hydro Debt Fund (MHDF) was established with support from GIZ which is earmarked for lending to MHPs. Initial MHDF of Euro 500,000 was established which was later increased by Euro 42,000. The overall objective of the fund is to improve the access to the rural population to clean energy solution by providing credit for off-grid MHPs. The fund is being channeled by two banks; the Himalayan Bank and the NMB Bank.

3.3.7 Biogas Credit Fund

Biogas Credit Fund was established in 2000 supported by Federal Republic of Germany through KfW to the Government of Nepal with the objective of financing the loan via intermediate wholesale lending organizations and receiving nongovernment organizations, saving and credit cooperative and / or rural development banks (NGO / SCO/RDBs) for granting sub-loans to those farmers, who are not able to cover the cost of the biogas plant by their own fund. Initial seed fund was of 5 million EURO. As of now, more than 300 LFIs/MFIs are involved to channel this credit to the biogas users.

CHAPTER 4: PROGRESS OVERVIEW

AEPC implemented renewable energy technologies through two separate windows; the targeted renewable energy program solely financed by GoN and the NRREP, jointly financed by the GoN along with other EDPs. During the reporting period programs implemented under targeted RE program achieved 94% physical progress against 96.3% financial progress. Similarly, for NRREP the physical progress stood at 57% against the financial progress of 70.26%.

Table 3: Annual progress of AEPC implemented programs

SN	Programs	Progress	Value
1.	Targeted RE program (GoN Financed)	Physical	94%
		Financial	96.3%
2.	NRREP	Physical	57%
		Financial	70.26%

4.1 ALLOCATION AND DISURSEMENTS

During the review period, AEPC implemented its activities through two routes; special and targeted programs and NRREP under the NREF. GoN allocated around 65% of the total budget to implement the Program from two windows; the targeted RE Program and the NRREP under NREF (Figure 9). The remaining fund was provisioned from foreign investment as a grant and loan. For NRREP alone, GoN allocated 51% of the total budget for FY 2017/18.

The total budget allocated for AEPC in FY 2017/18 was NPR 4732.82 Million out of which the expenditure was NPR 3325.41 Million. The overall financial progress of NRREP in the FY 2017/18 stood at 70.26%. Financial progress of targeted RE program implemented by AEPC during the review period stood at 96.3% whereas the progress under the NRREP remained around 60%.

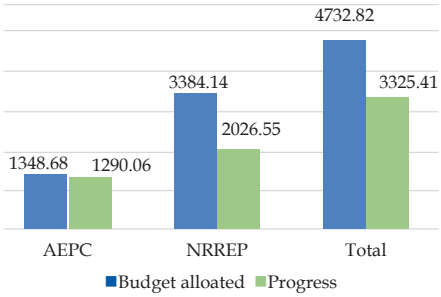


Figure 8: Budget allocated and the progress (In million NPR) (FY 2017/18)

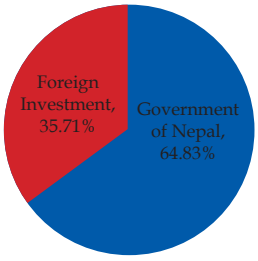


Figure 9: GoN allocation and Foreign Investment (Grant and Loan) in total RE budget

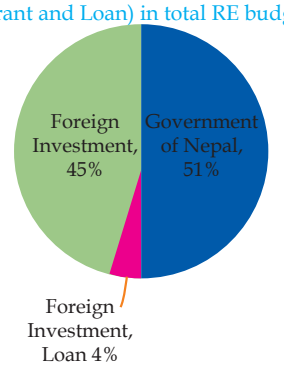


Figure 10: GoN allocation and Foreign Investment for NRREP

4.2 PHYSICAL PROGRESS

Physical progress of AEPC fund was stood at 94% whereas the physical progress of the activities implemented under NRREP stood at 57% only. The physical progress achieved during the reporting period is detailed in annex 1 and annex 2. GIS map of the renewable energy technologies promoted within the reporting period is presented at the end of this chapter while annex 3 lists out district wise installation of renewable energy technologies. Similarly, the annex 4 highlights the reason for the deviation observed compared to the planned target.

Physical progress of NRREP achieved during the reporting period was not too promising. Momentum of activities implemented by the Regional Service Centres (RSCs) and the District Environment, Energy and Climate Change Unit (DEECCS) in previous years was impeded broadly due to the local and provincial elections and transition of entire governance under the new federal structure. This led to delay in selecting Regional Technical Service Provider (RTSPs) who actually started implementation from the last trimester.

4.2.1 Mini & Micro Hydro and IWM Related Activities

The work plan of the FY 2017/18 targeted to produce 2,200 kW of electricity through Mini/Micro hydro power. In the review period, 1249 kW electricity was produced from the Mini/Micro-hydro standing with a progress of 104% from GoN budget whereas none of the SASEC projects completed during reporting period which resulted only 56.77% overall progress.

There was plan to rehabilitate the MHPs with total capacity of 2000 kW which were affected by the 2015 earthquake but MHPs with total 259 kW capacity could be rehabilitated during the review period.

Similarly, support (technical and additional subsidy) was provided to 25 sick/un-completed MHPs to complete the installation of those MHPs. The target for the same in the review period was 40. Regarding the grid connection of the MHPs, target to connect the 3 MHPs in the grid was entirely met. Of the 40 detail feasibility studies planned, progress was achieved for 21 MHPs.

Figure 11: Progress of key micro hydro related activities

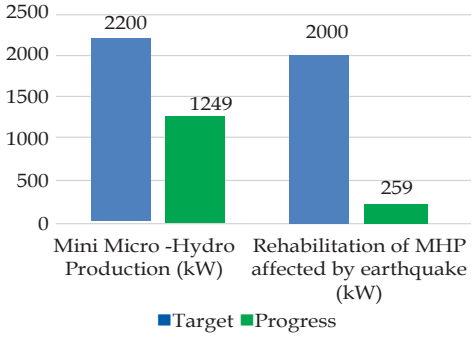


Figure 12: A typical MHP powerhouse

The main reasons for the low output in Mini/Micro-hydro sector was the lack of sufficient budget & human resources and some missing links in implementation structure. Due to the completion of first phase of NRREP in July 2017 compel the cut of the existing human resources involved in Mini/Micro hydro in AEPC. Furthermore, the termination of activity with Regional Service Centre (RSCs) also hampered the progress as the activities used to be undertaken by the RSCs and DEECCS at local level.

In case of IWM technology, of the total systems planned for deployment, 67.67% progress was achieved (203 installed against the plan of 300 IWMs). IWM technology implementation modality witnessed a transition during the review period. The program, earlier designed for RSC led implementation modality was transferred to the private sector. This transition led to a setback in smooth implementation of the program. Considering delays observed in selection of service providers for implementation of micro/mini hydro projects, continuation of the existing implementation modality also could not have rendered better results.

4.2.2 Solar Energy Related Activities

Progress on activities related to solar energy promotion was mixed; while most of the target set for the promotion of solar energy based technologies were over achieved, few remained under achieved and target related to battery management grossly remained unachieved. Installation target related to solar PV largely remained over achieved and same was the case with promotion of solar dryers and cookers. While the targets related to solar pumping for disadvantaged households and community water heating systems achieved satisfactory results, rest of the activities remained underachieved or unachieved. Meagre progress of 2% was achieved in deployment of Institutional Solar PV system (Figure 16) depicts progress of different activities planned for the solar energy technology.

Availing solar energy technology to the Disadvantaged group and Indigenous people was special program of the government for the review period. Under "Lighting for Education Program", AEPC succeeded to provide solar lighting systems to 63% of the targeted beneficiary. Similarly, government targeted to provide 215 solar pumping systems for disadvantage group progress for which stood at 87.44%. The renewable energy for health program was also able to achieve 57% of the planned target.

The activities under work plan of AEPC for FY 2017/18 also focused to the solar water pumping for drinking water and irrigation systems in general. Of the total target only 51% was achieved.

Figure 13: Solar panel mounted for solar pumping

Figure 14: Vegetable farming using solar irrigation

Figure 15: Drinking water tap sourced from solar water pumping system

The progress status depicts that the technologies with private sector led implementation had higher success compared to RSC led implementation. Targets associated with RSC led implementation such as solar mini-grid, solar irrigation and drinking water system and institutional solar PV systems had had impacts of the transition led delayed selection of the RSCs. The technologies with private sector led implementation however reveal the sectoral appetite and that the implementation plan related with them needs to be revisited.

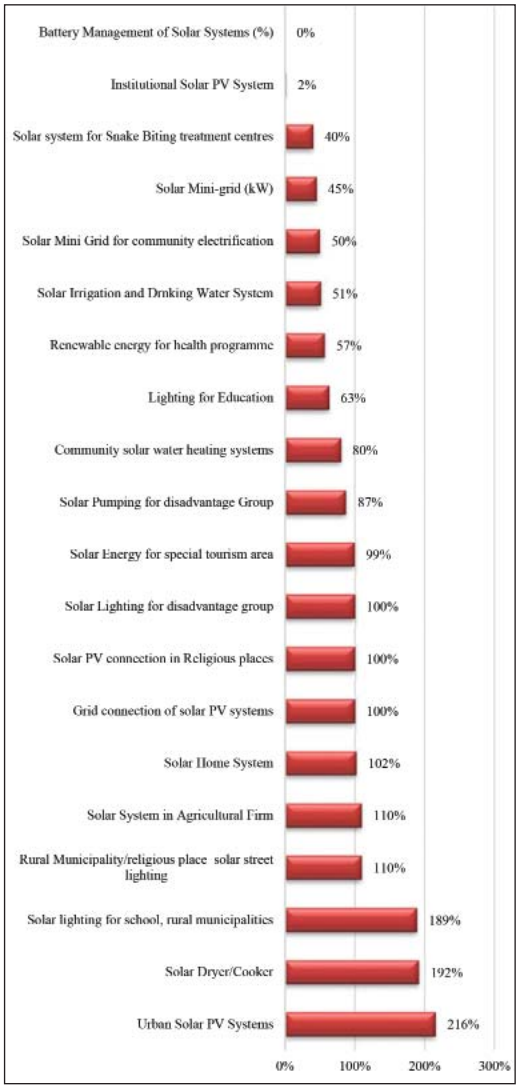


Figure 16: Progress of different activities under solar technology promotion

4.2.3 Biogas Energy

In the review period, AEPC largely targeted to implement domestic biogas plants along with urban, community, commercial and municipal biogas plants. Dedicated programs targeted at Dalits, marginalized group and earthquake affected victims were planned as well. All the activities planned under the domain of biogas went underachieved during the reporting period. Despite this consistency of the progress across activities planned is observed. Overall progress of the Biogas technology in the FY 2017/18 depicted in figure 17. In addition to the domestic biogas, AEPC has been supporting implementation of large size biogas plants with aim to utilize animal dung, agri-waste and municipal wastes as the substrate.

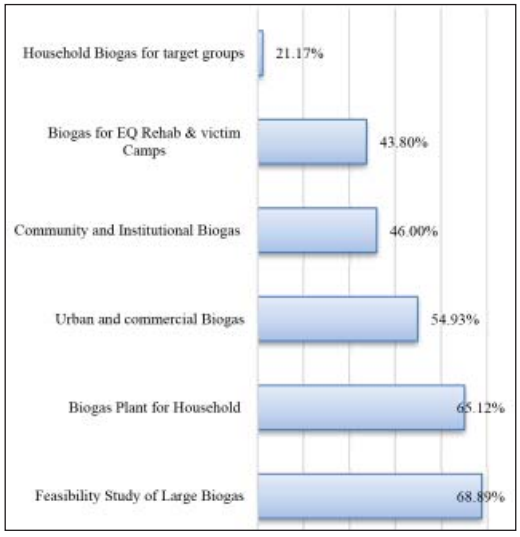


Figure 17: Progress of biogas technology

Figure 18: A biogas stove

Of the targeted 24,000 domestic biogas plants 15,628 (65.12%) was achieved. Additional, 7,700 households of Dalits, indigenous people were targeted to reach with the domestic biogas technology but the progress stood at 21%, the lowest among all activities planned under biogas technology. Similarly, another activity on the domestic biogas, again targeted to specific beneficiary- the earthquake victims also remained underachieved with 43.80% progress. Low progress was on urban and commercial biogas plants. Out of the total targets of 242 urban biogas and commercial biogas, 78 (54.93%) plants were installed.

AEPC targeted to provide technical and financial support to earthquake victims in rehabilitation of Biogas plants and provide fiber glass biogas plants for the earthquake victim camps. In this activity, about 44% of the targets were achieved of the total 5,000 such digesters planned for implementation. Progress on feasibility study marked to be the most successful activity planned for the biogas technology where feasibility of 62 (68.89%) large

size biogas plants were completed against the target of 90 feasibility studies. Similarly, 23 community and Institutional Biogas Plants were constructed during the reporting period against the target to install 50 (46%) such digesters.

Figure 19: A large biogas plant installed in Nawalparasi district

The completion of the first 5 years period of the NRREP largely affected the activities planned for biogas as well during the FY 2017/18. There was also dilemma in implementing structure as the country was federated and most of the household level activities are under the scope of local level.

4.2.4 Biomass Energy

Under the Biomass Energy portfolio, AEPC achieved a cumulative figure of 1.47 million ICS (mud and metallic) dissemination. Five different sets of activities were planned in the reporting for execution. The overall progress of planned activities remained to be satisfactory. Targets related to ICS dissemination at households and smoke free house program for targeted groups were overachieved. Achievement stood at 148.02% and 114.93% against the target of 10,000 MICS and 20,000 target households respectively. Promotion of institutional ICS (targeted at school, health post, hospital and religious places) went underachieved with progress of 57.2% against 500 such systems planned. The reporting period was remarkable on design, innovation and popularization of institutional improved cooking stoves (IICS) for Lokta processing industries and Khuwa production industries and further commercialization of gasifiers for thermal application with 24 installattion at the small and medium enterprises to process the agricultural products that halped inhance business activities.

Further there was installation of 6,380 mud improved cooking stoves with the support from partnering organizations in various parts of the country. Status of performance of different activities planned under the biomass energy is presented in figure 20.

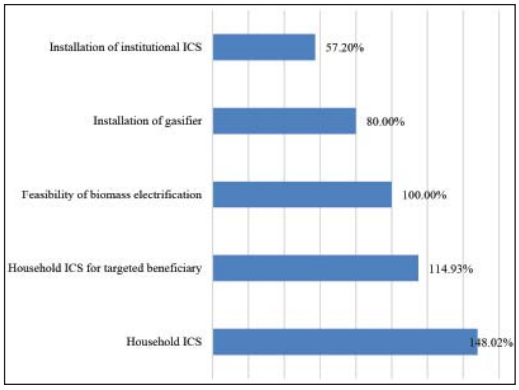


Figure 20: Progress of biomass related activities

Figure 21: A typical hitting and cooking type MICS

4.2.5 Wind Energy

In the reporting period, target was set to generate 100 kW electricity from the wind based energy and 30 kW from wind/solar hybrid systems. The progress of these two activities stood at 85% and 83.33% respectively. Similarly, five pre-feasibility study, three detail feasibility study, installation of one data logger and implementation of a resource mapping program were planned. All these activities were entirely achieved as targeted.

Figure 22: Data logger for wind energy

Figure 24: Installation of wind-solar hybrid system in Hariharpur Gadhi, Sindhuli

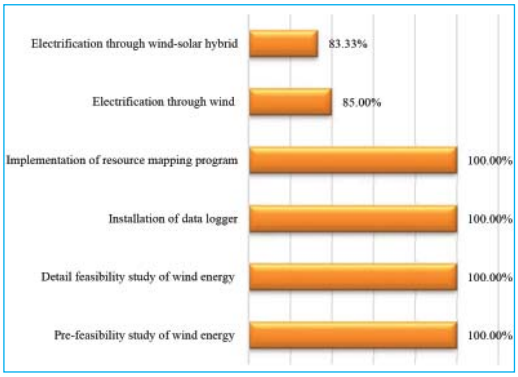


Figure 23: Progress under wind energy

4.2.6 Productive Energy Use activities

For the sustainability of any renewable energy project, productive energy use component has important role to increase the income of local people and generating new jobs in the vicinity of renewable energy project area. This enhances the people's ability to pay and purchase the renewable energy systems whereas the energy systems that provides the energy to the productive component also benefits from the high load factors and hence operating sustainably in the long run. This component is very important for the livelihood enhancement of the local people.

So, the energy components and the productive energy use complement each other.

Figure 24: Processing of handmade paper

In the FY 2017/18, there were 3 dedicated activities planned for promotion of productive energy use. The activities included training, monitoring and promotion, promotion of productive energy use and productive energy use activity for targeted group. Of the seven trainings and promotional events planned, all were achieved. While the progress of productive energy use promotion was achieved in 36% (72 out of 200), no progress was achieved in the activity planned for targeted group.

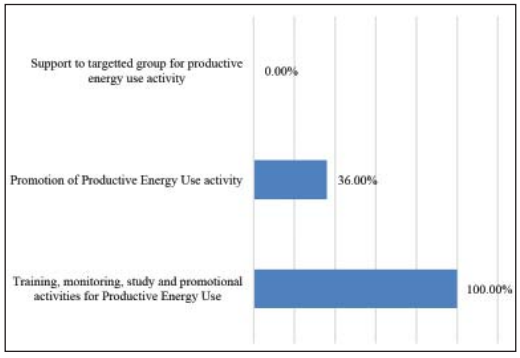
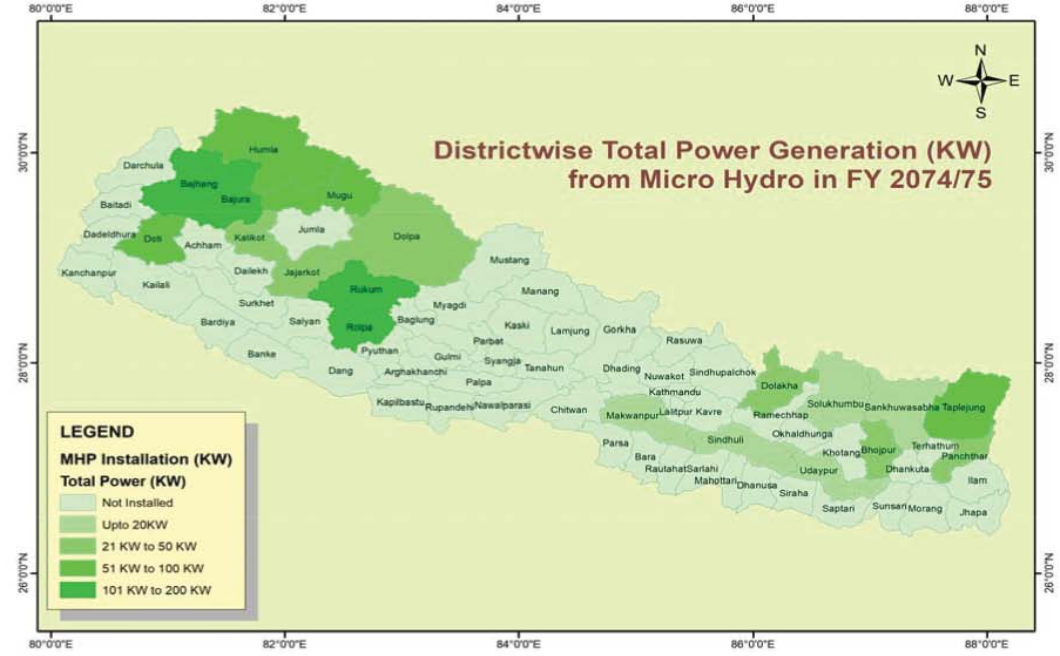


Figure 25: Progress of PEU activities

GIS MAPs OF RETS INSTALLED IN FY 2074/75



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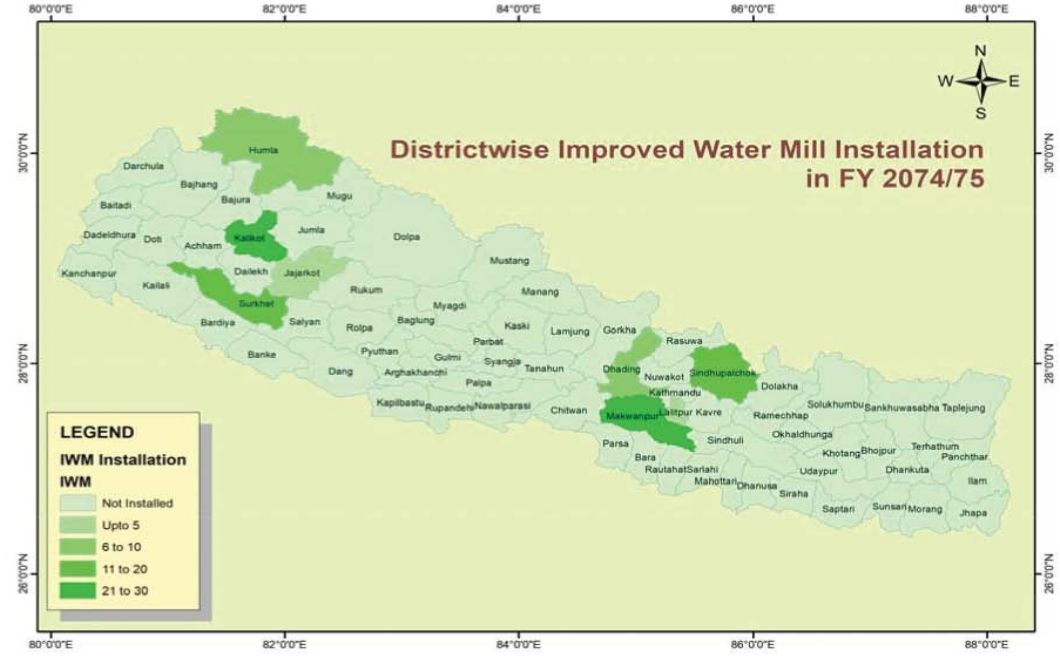
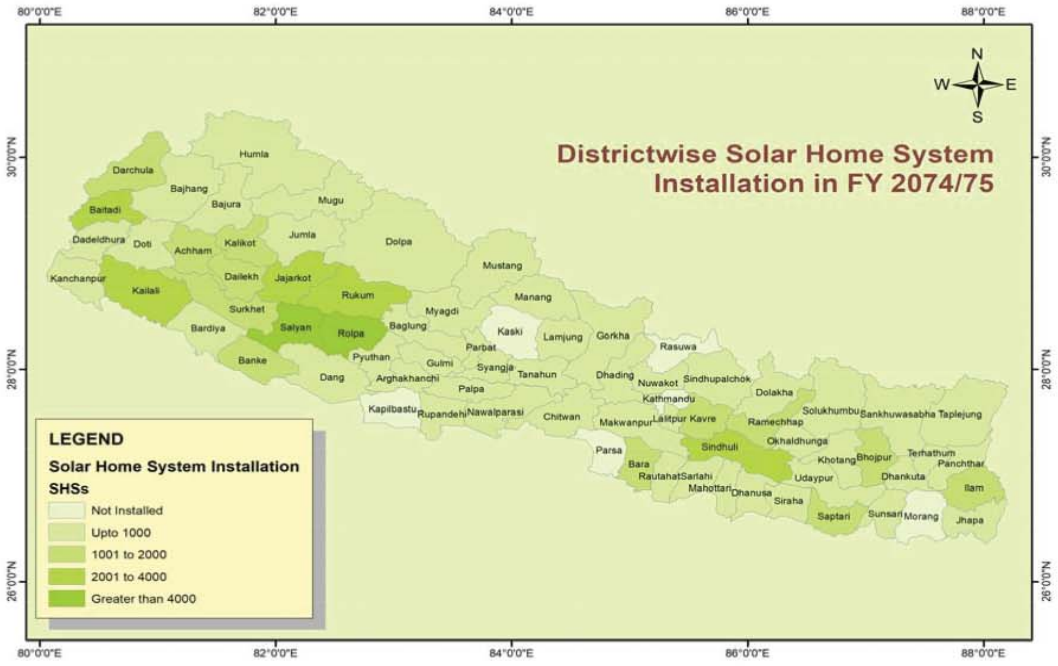
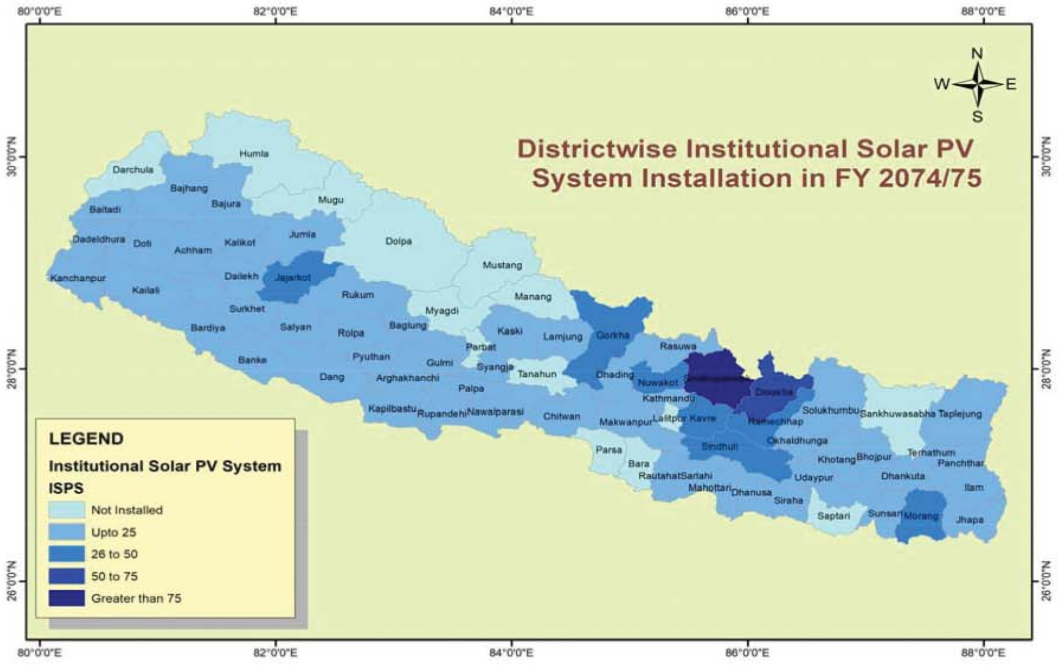
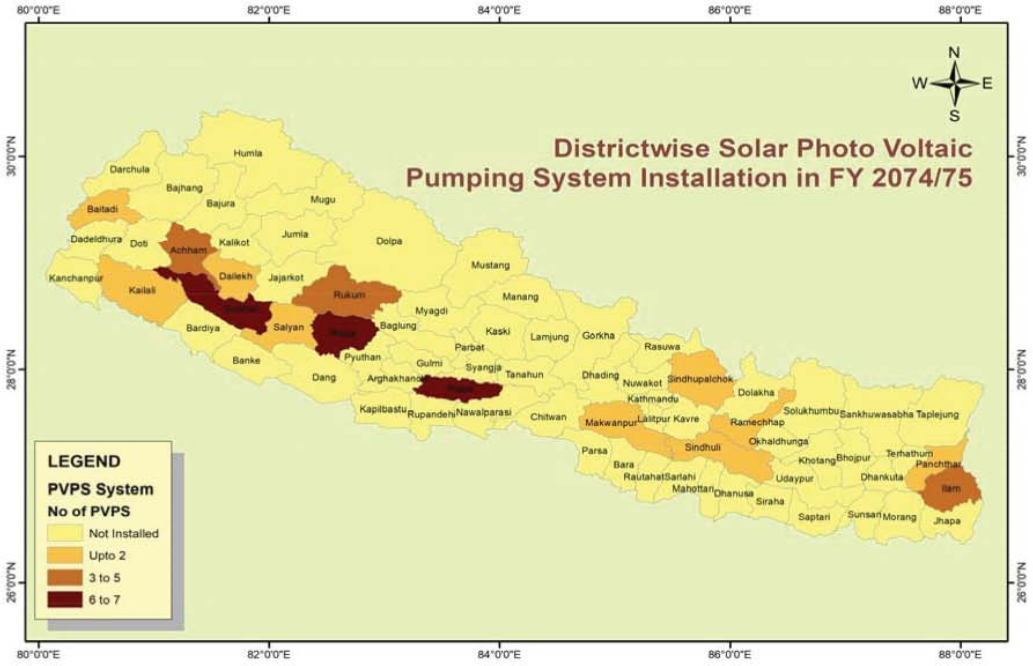
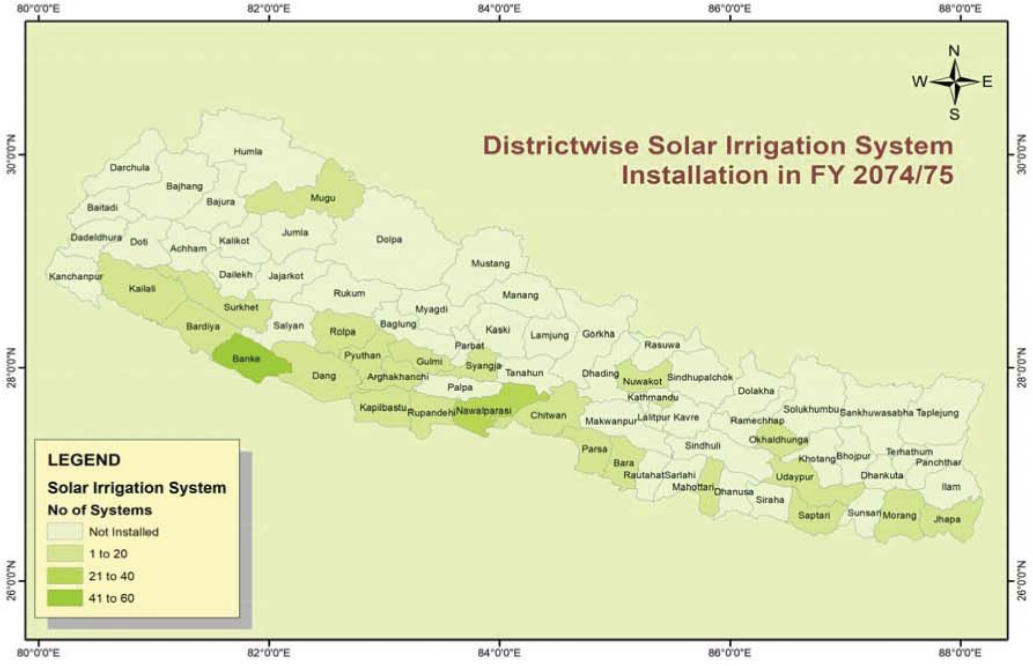
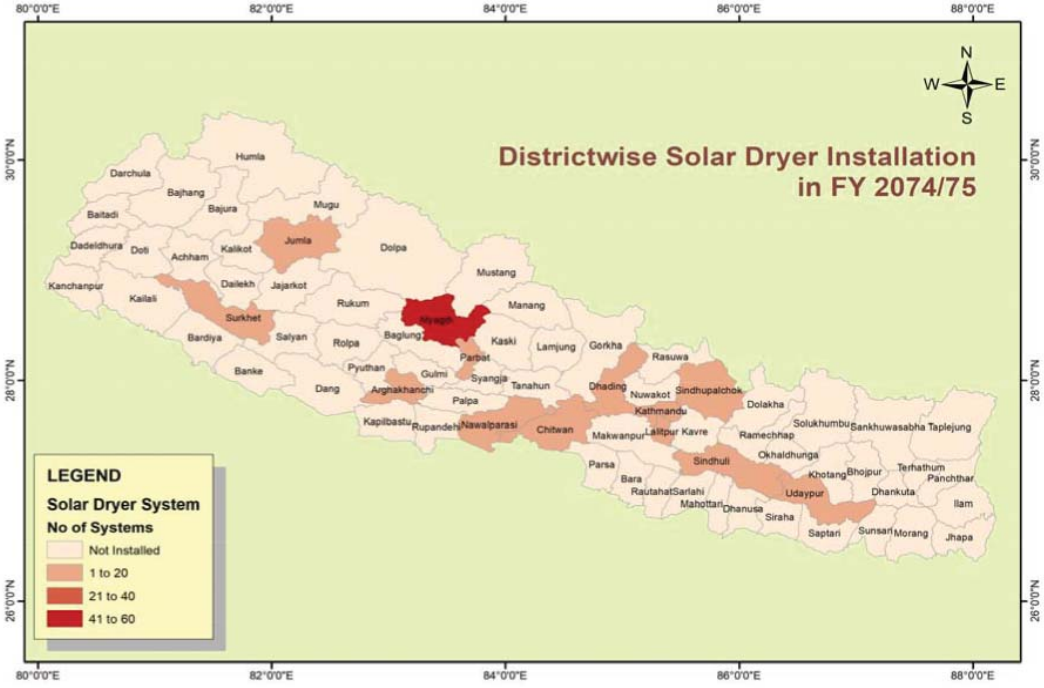


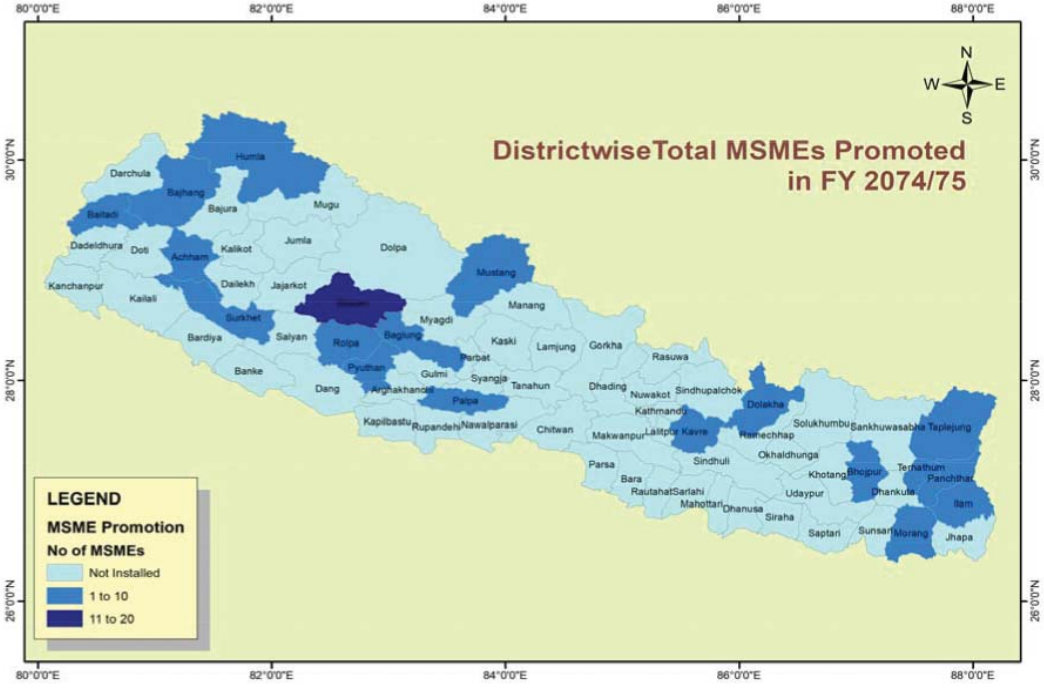

Districtwise Solar Home System Installation in FY 2074/75
N
W
E
S
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
LEGEND
Solar Home System Installation
SHSs
Not Installed
Upto 1000
1001 to 2000
2001 to 4000
Greater than 4000
Humla
Darchula
Bajhang
Bajura
Mugu
Baitadi
Dadeldhura
Doti
Achham
Kalikot
Jumla
Dolpa
Mustang
Kanchanpur
Kailali
Dailekh
Jajarkot
Rukum
Manang
Surkhet
Myagdi
Bardiya
Salyan
Rolpa
Baglung
Kaski
Lamjung
Gorkha
Rasuwa
Banke
Pyuthan
Parbat
Gulmi
Syangja
Tanahun
Dhading
Nuwakot
Sindhupalchok
Dang
Arghakhanchi
Palpa
Dolakha
Kathmandu
Kapilbastu
Rupandehi
Nawalparasi
Chitwan
Makwanpur
Lalitpur
Kavre
Ramechhap
Solukhumbu
Sankhuwasabha
Taplejung
Parsa
Sindhuli
Okhaldhunga
Bara
Rautahat
Sarlahi
Khotang
Bhojpur
Terhathum
Panchthar
Udaypur
Dhankuta
Mahottari
Dhanusa
Siraha
Ilam
Saptari
Sunsari
Morang
Jhapa

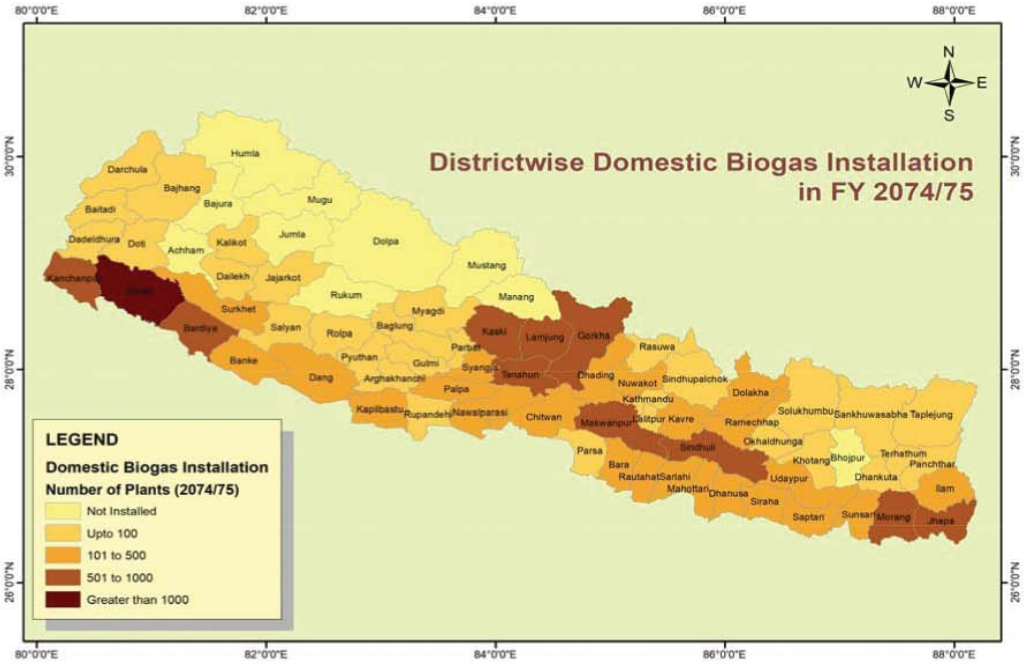

Districtwise Institutional Solar PV System Installation in FY 2074/75
N
W
E
S
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
LEGEND
Institutional Solar PV System
ISPS
Not Installed
Upto 25
26 to 50
50 to 75
Greater than 75
Humla
Darchula
Bajhang
Bajura
Mugu
Baitadi
Dadeldhura
Doti
Achham
Kalikot
Jumla
Dolpa
Mustang
Kanchanpur
Kailali
Dailekh
Jajarkot
Rukum
Manang
Surkhet
Myagdi
Bardiya
Salyan
Rolpa
Baglung
Kaski
Lamjung
Gorkha
Rasuwa
Banke
Pyuthan
Parbat
Gulmi
Syangja
Tanahun
Dhading
Nuwakot
Dang
Arghakhanchi
Palpa
Dolakha
Kathmandu
Kapilbastu
Rupandehi
Nawalparasi
Chitwan
Makwanpur
Lalitpur
Kavre
Ramechhap
Solukhumbu
Sankhuwasabha
Taplejung
Parsa
Sindhuli
Okhaldhunga
Bara
Rautahat
Sarlahi
Khotang
Bhojpur
Terhathum
Panchthar
Udaypur
Dhankuta
Mahottari
Dhanusa
Siraha
Ilam
Saptari
Sunsari
Morang
Jhapa

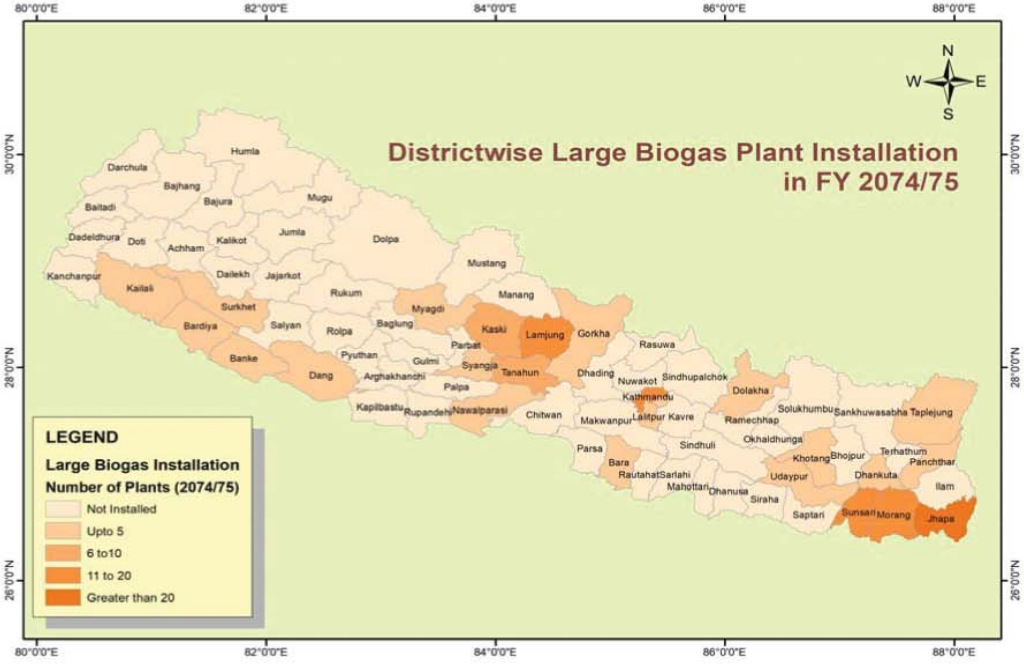

Districtwise Solar Photo Voltaic
Pumping System Installation in FY 2074/75
LEGEND
PVPS System
No of PVPS
Not Installed
Upto 2
3 to 5
6 to 7
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S

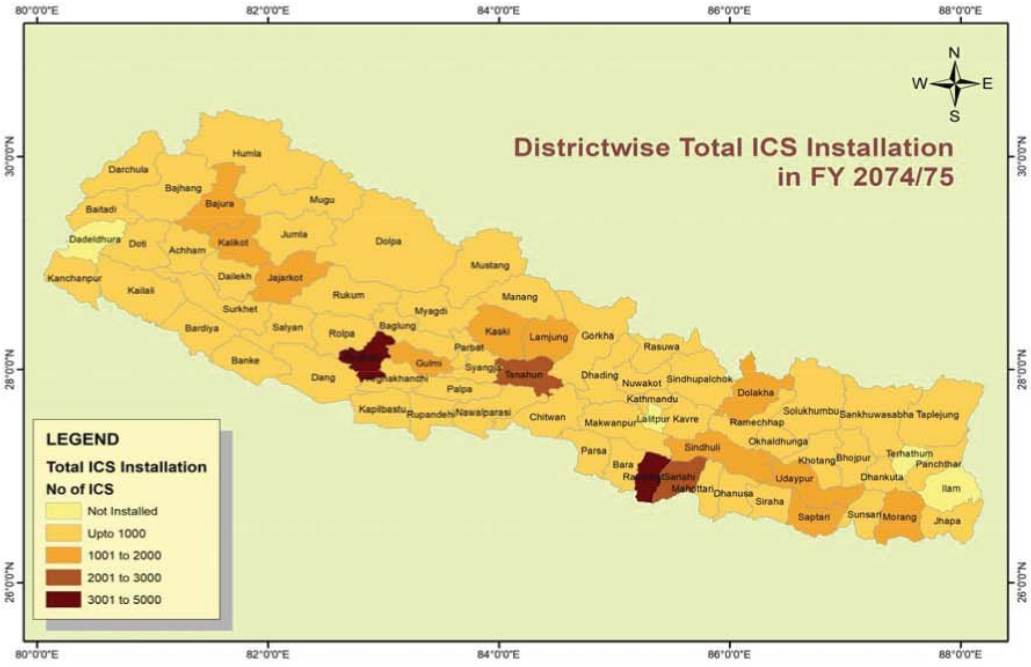

Districtwise Solar Irrigation System
Installation in FY 2074/75
LEGEND
Solar Irrigation System
No of Systems
Not Installed
1 to 20
21 to 40
41 to 60
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S

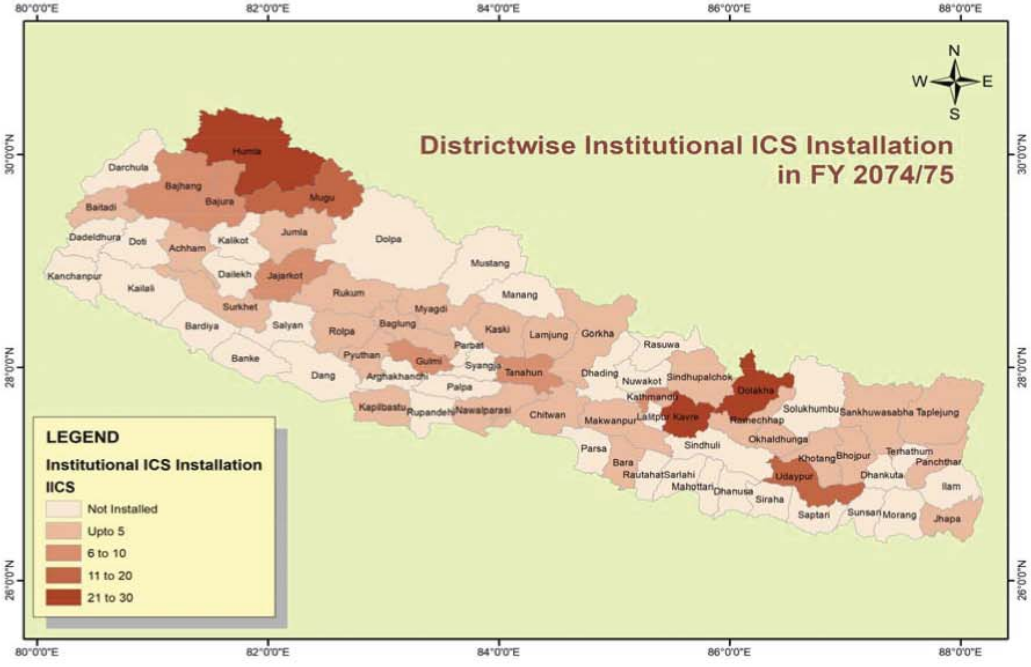

Districtwise Solar Dryer Installation
in FY 2074/75
N
W
E
S
LEGEND
Solar Dryer System
No of Systems
Not Installed
1 to 20
21 to 40
41 to 60
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N

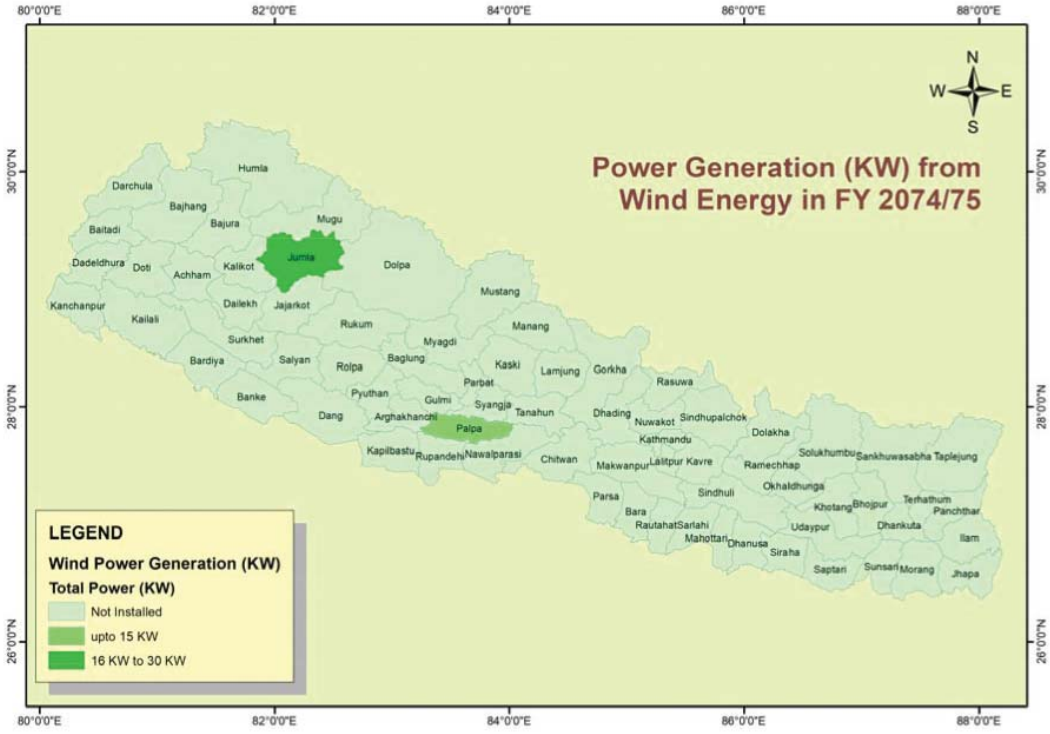

DistrictwiseTotal MSMEs Promoted
in FY 2074/75
N
W
E
S
LEGEND
MSME Promotion
No of MSMEs
Not Installed
1 to 10
11 to 20
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N


Districtwise Domestic Biogas Installation in FY 2074/75
LEGEND
Domestic Biogas Installation
Number of Plants (2074/75)
Not Installed
Upto 100
101 to 500
501 to 1000
Greater than 1000
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S


Districtwise Large Biogas Plant Installation in FY 2074/75
LEGEND
Large Biogas Installation
Number of Plants (2074/75)
Not Installed
Upto 5
6 to10
11 to 20
Greater than 20
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S


Districtwise Total ICS Installation
in FY 2074/75
LEGEND
Total ICS Installation
No of ICS
Not Installed
Upto 1000
1001 to 2000
2001 to 3000
3001 to 5000
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S


Districtwise Institutional ICS Installation
in FY 2074/75
LEGEND
Institutional ICS Installation
IICS
Not Installed
Upto 5
6 to 10
11 to 20
21 to 30
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
N
W
E
S


Power Generation (KW) from
Wind Energy in FY 2074/75
N
W
E
S
80°0'0"E
82°0'0"E
84°0'0"E
86°0'0"E
88°0'0"E
30°0'0"N
28°0'0"N
26°0'0"N
Humla
Darchula
Bajhang
Bajura
Mugu
Baitadi
Dadeldhura
Doti
Achham
Kalikot
Jumla
Dolpa
Mustang
Kanchanpur
Kailali
Dailekh
Jajarkot
Rukum
Manang
Surkhet
Myagdi
Bardiya
Salyan
Rolpa
Baglung
Kaski
Lamjung
Gorkha
Rasuwa
Parbat
Banke
Pyuthan
Gulmi
Syangja
Tanahun
Dhading
Nuwakot
Sindhupalchok
Dang
Arghakhanchi
Palpa
Kathmandu
Dolakha
Kapilbastu
Rupandehi
Nawalparasi
Chitwan
Makwanpur
Lalitpur
Kavre
Ramechhap
Solukhumbu
Sankhuwasabha
Taplejung
Okhaldhunga
Parsa
Sindhuli
Khotang
Bhojpur
Terhathum
Panchthar
Bara
Rautahat
Sarlahi
Udaypur
Dhankuta
Ilam
Mahottari
Dhanusa
Siraha
Saptari
Sunsari
Morang
Jhapa
LEGEND
Wind Power Generation (KW)
Total Power (KW)
Not Installed
upto 15 KW
16 KW to 30 KW


KFW

CHAPTER 5: PROGRESS OF CROSS CUTTING ACTIVITIES

5.1 CARBON FINANCING ACTIVITIES

AEPC is in forefront when it comes to the climate change related activities in Nepal. Climate and Carbon Unit (CCU) was established in 2010 to streamline the climate change related activities in AEPC. CCU has been instrumental in mobilizing the carbon financing and other climate change adaptation activities in AEPC.

5.1.1 Certified Emission Reduction

AEPC holds eight Clean Development Mechanism (CDM) projects and program of activities (PoA) which contributes as its regular source of revenue. Till date, about 1.8 Million Certified Emission Reduction has been sold equivalent to the 12 Million USD from household Biogas and Micro-hydro projects.

In terms of issuance of the certified emission reductions (CERs), the reporting period stood as the most successful year in the history with issuance close to 0.64 million CERs. In the reporting period, Biogas Project activities and PoA generated 0.58 Million CER whereas the micro-hydro project generated 56,694 CERs. The CER issuance from CDM projects under AEPC across different fiscal year is given in figure 27.

Similarly, the trading of the CERs during the reporting period garnered by AEPC was also the record higher in this reporting period. The total amount generated from carbon selling in this reporting period is about 3.7 Million USD.

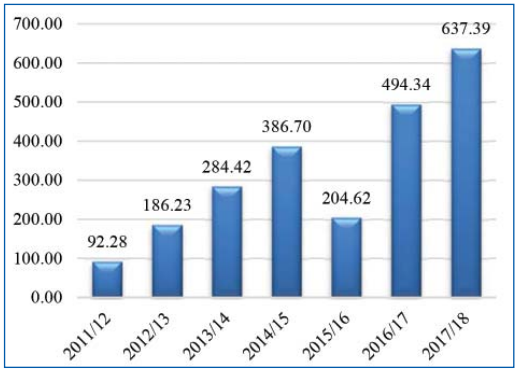


Figure 27: Year wise issuance of CERs (in '000)

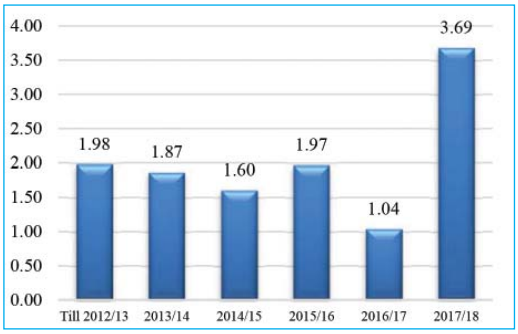


Figure 28: Year wise issuance of CERs (in M USD)

5.1.2 CDM Audits

Verification audit of the Biogas Project Activities and Nepal Biogas Support programme-PoA was initiated in the reporting period. Field verification was completed in the reporting period by Designated Operational Entity (DOE). Completion of verification is expeted to generate about 0.65 Million CERs. Similarly, the first verification of the Improved Water Mills PoA was also initiated which

is expected to generate about 20,000 CERs. The process of 14 Component Project Activity (CPAs) inclusion under Improved Cookstoves PoA was initiated and the draft validation reports was received from DOE during the reporting period.

5.1.3 Development of new mitigation projects

The project idea preparation for the large size biogas carbon project was also revived in this FY. The Programme Idea Note (PIN) for "Developing Large Size Biogas Carbon programme in Nepal" was updated. This project will be developed in programmatic approach under UNFCCC.

Similarly, Concept note for "clean cooking solution for all" was submitted to NAMA facility to develop NAMA supported project for the consideration. The concept has focus to promote tier-3 clean cooking solutions in province 5.

5.2 CLIMATE FINANCE INITIATIVE

In response to the call for expression of interest from the Ministry of Finance (MoF), National Designated Authority (NDA) for Nepal, AEPC posted its candidacy for national recommendation to seek the status of Direct Access Entity (DAE) with the Green Climate Fund (GCF). The application now was advanced to 2nd stage of the accreditation process of GCF and is being deliberated by the Accreditation Panel. Upon accreditation AEPC will be able to directly access the projects having low to medium environmental risks with GCF worth USD 50 Million.

The accreditation to the GCF will bring the following opportunity for AEPC as well as country.

- Opportunity for accessing climate finance "Directly".
- Ease for executing agencies in accessing climate financing
- Complimentary financial resources to bridge the gap.
- Enhancing the institutional capacity and build trust with international development partners.
- Opportunity for accessing other international financing.
- Building trust amongst donor agencies, private sectors.
- Complementing the country's need for CC adaptation/ mitigation by leveraging financial resources (International/public/ private).

5.3 GENDER AND SOCIAL INCLUSION

Gender and social inclusion activities are internalized by AEPC following the exit of NRREP program in 2017 July. The GESI activities are internalized across all technologies. To streamline the GESI related activities, GESI policy of AEPC was drafted in the reporting period. The policy is submitted to the AEPC board for the approval. After the implementation of the policy, the GESI related activities will be strengthened.

5.4 ENVIRONMENT AND SOCIAL SAFEGUARDS

The environment and social safeguard issues are being dealt project by project and the case by case as required by the project documents and Environment protection Act and Environment Protection Rules of Nepal. In order to effectively implement the Environmental and Social Safeguard (ESS) Policy adopted by AEPC, a dedicated Environment and Social Safeguard Unit has been established. The unit will act independent of the technological units the staffs are assigned to in order to streamline environment and social safeguard measures across all technologies promoted by the organization.

5.5 COMPLIANCE RELATED ACTIVITIES

To strengthen the internal control, internal audit and the compliance related issues, AEPC board internalized the compliance unit in last FY. The compliance and ethics sub-committee was also established under the board. The compliance function was internalized from the learning of the NRREP implementation. Being a first full year of the implementation of these activities, compliance unit initiated few important tasks during the reporting period. Compliance unit verified the technology implementation found deviated during the payment. It also completed the Information Security audit of AEPC. Compliance unit started the first compliance review of AEPC and also initiated the audit of the effectiveness of compliance and ethics function implementation. Based on those reports, compliance unit will recommend AEPC management to improve the internal control, ethics, internal audit and compliance function of AEPC.

5.6 MONITORING AND QUALITY ASSURANCE

The monitoring and quality assurance activities are the integral part of the program/project implementation under AEPC's portfolio of work. Various monitoring and quality assurance activities were also undertaken during this reporting period. Basically, monitoring and quality assurance activities were conducted through DEECCS, third parties, Regional Technical Service Providers (RTSPs) and by Centre as per the requirements. There were various other activities planned in 2017/18 under AEPC and NRREP.

There were capacity development activities were proposed to enhance the knowledge and awareness of people on renewable energy and productive energy use. The target was completely achieved during the reporting period. Similarly, for the monitoring, quality assurance and implementation of the activities, District Environment, Energy and Climate Change Sections (DEECCS) were mobilized until the second trimester of the monitoring period. It was targeted to increase the

credit mobilization by 28% for the RE promotion through Central Renewable Energy Fund (CREF) but only 7% could be achieved during the reporting period.

5.7 OUTREACH MANAGEMENT

The immediate objective of Outreach is to ensure scaling up of RETs through efficient and collaborative engagement with local and provincial level governments, line agencies, national and provincial/regional service delivery organizations, private sectors, other relevant programms /projects, organizations and other relevant stakeholders. This involves coordinating and collaborating to provide strategic support for expanding RE access to the target beneficiaries through local and provincial level governments (i.e. based on the existing legal mandate), national and provincial service providers. Outreach utilizes existing institutional linkages to enhance the livelihood of the off-grid communities through intervention of RE services. In this context, ownership, harmonization, synergy, result based monitoring and alignment are most crucial elements of the coordination, while clarity on roles and responsibility of all stakeholders is important for establishing collaborative environment. In light with these premises, two project implementation units at province 1 and 7 are established. Similarly, bilateral coordination meeting with others provincial governments have been completed for establishing provincial set up. Further, Outreach has conducted two local level RE orientation program in province no. 2. Outreach aims to provide technical support to all 753 local level and 7 provincial governments to implement RE activities in line to the existing legal framework.

5.8 TRAINING AND CAPACITY BUILDING

AEPC continued with the capacity development activities of its partner organizations and other sectoral actors during the reporting period. Capacity development activities targeted wide range of stakeholders; from key sectoral actors (political leaders to bureaucrats) to private sector and local people. In the reporting period potential biogas entrepreneurs were among the group that received significant attention through their participation in the workshops followed by biogas construction companies. Consultants were trained to maintain their pace with the AEPC's requirements and trainings were organized for the operators of micro and pico hydro projects and managers of the micro hydro projects to introduce them or update their knowledge on sound management practices. At operational level, stove masters, biogas masons and installers were trained to ensure availability of respective expertise at local level to implement respective technology. Details of training programs conducted is provided in annex 5.

Table 4: Synopsis of capacity development activities for targeted groups

SN	Participant Category	No. of Participants
1	Entrepreneurs	280
2	Private companies	125
3	Micro hydro staff	100
4	Consultants	90
5	Local people	78
6	Sectoral actors	65
7	Biogas supervisor	50
8	Stove masters	50
9	Biogas masons	50
10	Pico hydro staff	18
11	Trainers/Installers	10
	Grand Total	**916**

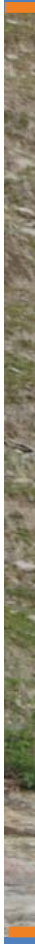
In addition to the activities discussed above, AEPC organized a series of orientation activities to its internal staffs to get them acquainted with and update their knowledge base on variety of affairs dealt by different units within the organization. The following orientation programs were organized:

- Spatial variation of Biomass energy supply and demand in rural Nepal
- Solar Systems (PV& Thermal): Design Principles; Project Management
- Design of Large and Grid Connected Solar Systems
- Technical and Management Aspect of Solar and Solar/Wind Hybrid Mini Grid System in Nepal.
- Environmental and Social Safeguards Policy and tools for RETs (IEE, EIA, SIA, etc)
- Technical and Management Aspect of Solar and Solar/Wind Hybrid Mini Grid System in Nepal.
- Technical Aspects of Large Biogas and Waste to Energy Projects
- PEU, Enterprises and IGA
- Carbon Financing: CDM Project Cycle and GCF
- Technical Details on Cookstoves and Gasifiers
- Financial Mismanagement & Fraud Prevention Guideline: Behavioural insight for Public Integrity
- Technical Aspects of Micro/ Minihydro projects
- GoN Accounting, Financing & Arrears
- GoN Planning and Budgeting; SoP/ Municipal Energy Planning
- "Impact of Finance Bill 2075 on Tax Laws"
- "Dry Anaerobic Digestion for Methane Production and its Optimization"
- "Smart system for feasibility study of mini-hydropower project"
- "Leadership, Stress - Management & Team Building"

5.9 STUDIES AND REVIEWS

Besides the regular monitoring to verify the installations and after sales service obligations as required by the renewable energy subsidy policy and delivery mechanism, AEPC specifically monitored its CDM projects for their successive verification and issuance.

NRREP completion report was prepared during the reporting period that covers the five years from FY 2012/13. Similarly, audit of technical support and PEU components of the NRREP were completed while the audit of Central Renewable Energy Fund (CREF) was at the verge of finalization at the end of the reporting period. Towards the end of the reporting period, AEPC commissioned an independent consultant to consultant Annual Environmental and Social Safeguard Review of AEPC.



CHAPTER 6: RENEWABLE ENERGY RESULT AREAS

6.1 ACCESS TO CLEAN ENERGY

Renewable energy promotion in Nepal has been instrumental in providing clean energy access to the beneficiaries. Till date about 55 MW of electricity has been produced from Mini/Micro-hydro and Solar energy promoted by AEPC providing the access to 3.6 million households with clean energy solutions. This has reached to the electricity access to 18% of the total population and has created 30,000 jobs in this sector.

In this reporting period generation of 1,249 kW electricity was achieved from Mini/Micro-hydro projects. This has ensured enhanced access of electricity to more than 6,000 households and created opportunities for the establishment of local enterprises. In addition to this, by rehabilitating the MHPs equivalent to 259 kW, access to electricity of more than 1,200 households has been reinstated. More than 95,000 household benefitted from the electricity generation through solar home system. Similarly, solar mini-grid installation, supported to light around 900 households.

ICS and biogas remained to be the key technologies providing the households with clean energy for cooking. During the reporting period, more than 55,000 households realized the benefits of clean cooking energy supplied by these technologies.

IWM technology supported rural households with faster agro-processing services thereby reducing drudgery and avoiding the potential proliferation of the fossil fuel based diesel mills. Installation of IWM during the reporting period is expected to provide efficient milling services to over 4,000 rural households.

6.2 Sustainable Development Benefit

Promotion of renewable energy under AEPC has a range of sustainable development benefits which are fully attributable to these technologies.

Environmental Benefits: The optimization of RET resources available locally for energy production helps to replace the carbon intensive fossil fuel for energy generation. This will help in reducing the emission of long lived and short lived pollutants.

Health Benefits: The supply of clean energy leads the reduction in indoor air pollution and energy related accidents. Further the proper management of the waste (dung, municipal waste, human excreta) leads to the reduction in incidence of disease caused by disease vectors.

Economic Benefits: The access to clean and green energy reduce the fossil fuel consumption so that dependency over the imported fossil fuel is reduced. Further it will create new entrepreneurial opportunities and enhance the income opportunities through sale of products and accessories.

Social Benefits: The renewable energy projects connect the community for managing and implementing the projects. Similarly, for the waste to energy project and Biogas, this will reduce the socio burden to effective waste management.

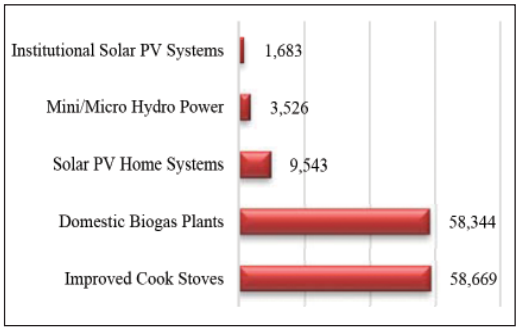
Technology Transfer: Some of the renewable energy technology such as large biogas and wind offers new technological option for the users to get familiarized with. On broader perspective, the local market will also have opportunity to enhance their technological know-how on new advancements on these technologies.

The technologies implemented during the reporting period helps in achieving the Sustainable Goal 3, goal 7 and goal 13 directly whereas it also helps significantly in achieving the goal 1, goal 2, goal 4, goal 5, and goal 6 where as complements to achieve other goals as well.

Figure 29: Key RE related sustainable Development Goals

6.3 Green-house Gas Emission Reduction

During the reporting period, the technology implemented by it helped in reducing the significant amount of Green House Gas Emission reduction. The estimated amount of emission reduction achieved by the technology implemented in the reporting period is 134,326 tCO2eq. The detail technology wise emission reduction achieved is given below:



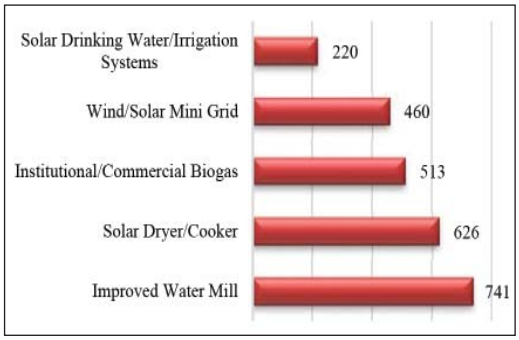


Figure 30: Emission Reduction Achieved by RETs installed during reporting period

The amounts of emission reduction given above are the estimated amount of emission reduction and not resembles to the tradable CERs.

Shifting Paradigm through Commercial Biogas

AEPC with support from the World Bank has been promoting anaerobic digestion technology for the deployment of large scale commercial and municipal biogas projects. Being relatively new avenue in the existing renewable energy market scenario, there was need to build market confidence to bank on this potential. The SREP program had provision to inject 40% investment as grant to leverage the risk taking potential of the private sector.

Mr. Abhirath Agrawal approached AEPC with his noble idea to generate energy and fertilizer out of trash under the banner of Envipower Energy and Fertilizer Pvt. Ltd. of which he is a founding partner. At the precocious age of twenty-five, Mr. Agrawal along with a handful of employees, mostly highly skilled engineers, he founded a waste processing facility in Nawalparasi. He's helping accelerate Nepal's transition to a low-carbon economy "I've wanted to work in renewable energy since I was a university student," says the young and successful entrepreneur who ably broke the barriers to private sector participation in low-carbon development.

When organic matter like manure, food scraps, or sewage decomposes, under certain conditions it produces methane gas. This gas is then processed, sold, and used for cooking, lighting, heating, electricity generation, and even automotive fuel. It is not only better for the environment, it is also more affordable than liquid petroleum gas (LPG). At the moment, Abhirath's Envipower sells around 150 cylinders of compressed natural gas and 12 tons of organic manure on daily basis. Mr. Agrawal persuades other entrepreneurs invest in this technology and has plans to set up another similar industry in near future.

I Might Live Longer Using a Clean Cookstove

I am Shila Giri. I live in Panchkhal Municipality – 5, Khawa. We are five in our family. I work at home. Together with the women of our village, we have formed a business group. I work with them in the daytime. My husband is a teacher at a local school. It is our main source of income. In the past, a stove was made by planting three stones or bricks, mixing husk and clay, or beneath iron.

This stove emitted a lot of smoke. If the house had no chimney or ventilation

for the smoke to exhaust through, the smoke would almost choke you. It was quite difficult to cook food on that stove and it consumed a lot of firewood. Now we have Eco cookstoves. It is cleaner than others and easy to operate.Although it is expensive in the market, we bought them from Sabah Nepal on 60% discount at NPR 3,000 apiece. It emits a little smoke while lighting it but not much after it gets lit. If it is lit outdoors, it doesn't cause much smoke. It is portable so it can be taken anywhere. We have trees on our farm. Firewood collected from the trees is sufficient for the stove. We don't need to buy firewood. Women need to do a lot of work which is invisible. Sometimes we wish we could cook food easily and quickly while being busy with other chores. This Eco stove has made it easier. It consumes less time as well.

In the past, it used to take two hours to cook food but the food gets cooked in an hour in this clean Eco stove. It's not good for health to spend hours amidst the smoke. The smokeless stove is obviously beneficial to health. It seems I'll live longer. In the past, I used to have a headache while cooking food amidst the smoke. I used to suffer from nausea while coming out after cooking food indoors. It used to be too hot while cooking on the old stove and sometimes I used to get burnt. However, the flame doesn't come out of this Eco stove. Since we bought this stove during the winter season, the villagers used to gather around the stove to keep warm. Our children also huddled together around the stove. For them, it was new and interesting.

I feel its fan is weak and it might break down. I wish it doesn't last only for few days. The battery, once charged, lasts till we cook two meals. It takes 2-3 hours to get recharged. Earlier it lasted till we cooked three meals but nowadays it lasts for only two meals. It seems the battery has weakened. Taking these things into consideration, next model can be improvised. These days we have continued electricity supply. We don't have much power cuts but if it happens the stove will lose its significance.

Life is Easy with Solar Pumping

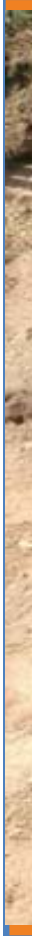
"Pramila! Pramila….. Wake up! .... Wake up, it's late already for water. People around are already in spring". It is a daily routine of Pramila's mom to wake her up early in the morning. But the time has changed now and working pattern too. It used to be the time when those kids were to take pot and basket to fetch water instead of pencil and copy.

The Alternative Energy Promotion Centre under National Rural and Renewable Energy Program, in the facilitation of ASTHA-Nepal Surkhet, the Share VDC Ward No 9 of Dapcha Surkhet has been able to install the Rural Solar Drinking Water Project recently. In the aftermath of this installation hundreds of children like Pramila shared the friendship of basket and pot with pencil and copy. At least 2 hours of day used to

be separated for fetching water, says project treasurer Gauri Gharti Magar. She further says, she spends that time in cleaning and other house work these days.

Due to water shortage earlier the kids used to be late for school. Also because of insufficient water the hygiene was also not that good says, project's secretary Khadka Buda Magar. The water has brought an opportunity of vegetable farming says, Chairman Amar Buda Magar. Further, he adds in this village of Magar Ethnicity with the commencement of solar pumping water a different environment of happiness has come, people have forgotten the past's hectic and miserable daily routine. From each household the individual have also started to collect a small amount for repair and maintenance purpose.

Earlier the ladies who used to hesitate to go Botaechour Bazzar has now been paying special attention in cleanness and hygiene says, 52 years old Ram Kali Gharti Magar. Today Dapcha village has been announced a total hygienic and clean place to live in



CHAPTER 7: PROBLEMS, CHALLENGES AND LESSONS LEARNT

7.1 SECTORAL CHALLENGES

Energy sector of Nepal is largely dependent on traditional resources putting the pressure on natural resources and environment. Approximately 69% population still rely on traditional energy resources mainly for cooking which is huge sectoral challenges.

Another key challenge is to bridge the knowledge and information gap existing at state actors at different levels of governance. With the newly established federal structure, there is huge challenge to integrate and harmonized renewable energy initiatives at all three levels of governance.

Scaling up of the renewable energy technology, appropriate promotion of the end use activities and grid connection of the electricity produced by renewable energy system needs propulsion in order for the sector to gain momentum.

7.2 INHERENT PROBLEMS AND CHALLENGES OF AEPC

AEPC was formed through a formation order. In order to have more firm establishment to strengthen renewable energy agenda, AEPC needs to get established through a separate Act. This agenda has remained the priority of AEPC since very long time. Having change in the line of ministry to the MoEWRI, the ministry has formed a committee to draft AEPC bill and committee conducted several rounds of interactions with stakeholders and submitted draft bill to ministry. Lack of own land and building is also a key challenge for AEPC which not only affecting institutional stability but is also burdensome to the government incurring expenditure against office rent.

Besides these challenges, followings are few operational challenges which needs to be addressed by AEPC.

- Re-engineering AEPC and its functions in new federal context
- Finalizing working modality with local and provincial governments
- Utilizing carbon revenue for investments in RE sector
- Mitigating the turnover of qualified staffs
- Engaging Development partners and attracting more investments from international climate funds such as GCF and NAMA facility.
- Aligning and harmonizing DPs support within National Renewable Energy Framework
- Maintaining quality standards of RETs and adopting new technologies
- Adhering new policies and regulations for system improvements

- Transforming towards Centre of Excellence

7.3 LESSONS LEARNT IN THE REPORTING PERIOD

Based on experience on implementation of programs/ projects, Followings are the key lesson learned:

- There is huge budget gap between the NRREP budget and available budget especially in some development partner's supported projects. This situation demands resolution before start of the annual planning process
- Use of electronic tools such as Subsidy Administration Management System (SAMS) for subsidy administration was successfully implemented which helped AEPC go paperless processing of subsidy application forms of the household based technologies. This has potential for replication to community and institutional RE systems.
- Delayed selection of the renewable energy service delivery partners is assessed to be one of the major reasons of underachievement for most of the targets linked with renewable energy systems targeted to community. Selection of partners on timely basis with defined roles is imperative to maintain the service delivery as planned.

7.4 OPPORTUNITIES AND WAY FORWARD

With every challenge an opportunity prevails; crucial is the ability to bank on the prevailing opportunities. There are opportunities for the implementation of renewable energy technologies but the sector could not attract sufficient financial resources. AEPC is aware of the prevailing opportunities for renewable energy financing through a climate window and has also taken initiatives to tap most out of it. Moreover, AEPC needs to look ahead on what it can bank on through partnership with one or more global initiatives. AEPC sees the following as the key opportunities for the promotion and deployment of renewable energy in Nepal.

- Global concerns on climate change and its impacts create avenue for renewable energy deployment.
- National commitments on SDG and NDC targets demands concerted efforts towards promotion of renewables reaching out to the most deprived and help graduate others who already are using its basic form.
- New and additional funding opportunities through international climate financing window such as GCF and CIF will help leverage national private sector investment as participation

of such funds would act as risk guarantee for private investment.

- Leveraging synergy with NEA and other institutions for large scale grid connection of RETs in new ministerial set up

In order to tap these opportunities overcoming the challenges, AEPC envisioned the followings way forward measures which might require further strategic deliberations.

- Restore key service delivery partners to ensure that the beneficiaries receive the desired services.
- Start dialogue with the government to clear transition in renewable energy technology promotion responsibility conferred to the local governments by the constitution. AEPC can support government in institutionalizing renewable energy service infrastructure at the local government level.
- Re-Positioning AEPC in changing roles through transition plan and strategic plans suiting AEPC in federal context.
- Institutional strengthening through enactment of its own act
- Strengthening compliance unit by making its more resourceful and attending to the compliance related finding on priority basis.
- Streamlining new mandates and responsibilities such as energy efficiency, working modalities with local and provincial governments
- Prepare a competent team to prepare bankable proposals for climate financing.
- Implement new financial mechanisms such as smart subsidy, challenge fund, result based financing etc. to prepare private sector to leverage more investments in the renewables
- Engaging private sectors as investors/partners rather than contractors
- Special focus for reaching to last mile people
- Integrated Energy database and energy information exchange system within three level of governments
- Aligning DPs support through integrated result framework
- Strengthen compliance and internal control systems
- Upscaling RE sector in terms of its capacity, investment and size

ANNEXES

Annex-1: Progress achieved for the programs/activities implemented with financing from government budget

SN	Activity/Program	Unit	2017/18		
			Target	Achievement	% achievement
1	Data logger installation for wind energy mapping	No.	1	1	100
2	Wind Solar Hybrid system for electrification	kW	30	25	83.33
3	Awareness Programme on Renewable Energy	No.	14	14	100
4	Promotion, monitoring and quality control of Renewable energy through DEECCS	District	75	75	100
5	Development of Act, regulation and working procedure on Renewable energy	No.	3	3	100
6	Community Electrification through Solar Mini-grid	No.	2	1	50
7	Detail Feasibility Study of Wind Energy Project	No.	3	3	100.00
8	Pre-feasibility Study of Wind Energy Project	No.	5	5	100.00
9	MHP Mini-grid and connection to national Grid	No.	3	3	100.00
10	Urban Biogas Plant installation	No.	100	0	0
11	Wind Energy Resource Mapping	No.	1	1	100.00
12	Feasibility Study of Large Biogas	No.	90	62	68.88
13	Promotional activity, capacity building, training on Bio-fuel	No.	3	3	100
14	Pre-feasibility study for electrification through bio-fuel	No.	5	5	100.00
15	Pre-feasibility study for electrification through bio-mass energy	No.	3	3	100
16	Formation of Mini-grid and Grid connection of MHPs	No.	3	2	66.67
17	Real time monitoring (performance database) for solar energy	No.	1	0	0
18	Technical support to grid connected solar and net metering	No.	2	2	100
19	Study, training, promotional activities related to productive energy use	No.	7	7	100
20	Detail feasibility study of mini/micro hydro projects	No.	40	21	52.5
21	Clean Energy Park establishment	No.	1	1	100

SN	Activity/Program	Unit	2017/18		
			Target	Achievement	% achievement
22	Additional Subsidy for Sick projects	No.	40	25	62.5
23	Solar electricity for religious institution	No	1000	1000	100
24	Solar energy installation for Agricultural Firms	No	10	11	110
25	Lighting for Education program (Solar systems for students of 9 and 10 standards belonging to dalits, marginalized, poor, etc)	No	20000	12600	63
26	Solar irrigation systems for dalits, marginalized, poor, etc	No	215	188	87.44
27	Household Biogas for dalits, marginalized, poor, etc	No	7700	1630	21.16
28	Solar electricity for dalits, marginalized, poor, etc	No	20000	20000	100
29	Solar energy for vaccine Refrigerator in snake biting treatment centre	No	10	4	40
30	Portable metallic stoves for dalits, marginalized, poor, etc	No	20000	22985	114.92
31	Solar street light for rural municipality, tourist area and religious dham	No	60	66	110
32	Solar electricity for public school, rural municipality	No	180	341	189.44
33	Institutional solar heating systems for hot water for targeted community	No	5	4	80
34	Subsidy and credit mobilization for urban solar systems	No	2500	5400	216
35	Productive energy use for dalits, marginalized, poor, etc	No	21	0	0
36	Gasifier heating system for MSME related to agriculture	No	30	24	80
37	Institutional Improved cooking stove installation in religious places, tourist area, public schools, hospital, health-post and public institution	No	500	286	57.2
38	Renewable Energy for Health Programme (Solar Energy health post, sub-health post, Birthing Centres, Government and community hospital)	No	160	91	56.87
39	Solar energy for home stay in special tourist area, community information centres	No	500	496	99.2
40	Electrification through wind energy	No	100	85	85
	Total physical progress				**94%**

Annex-2: Progress achieved for the programs/activities implemented under NRREP

SN	Activity/Program	Unit	2017/18		
			Target	Achievement	% achievement
1	Mini/Micro hydro installation	kW	2200	1249	56.77
2	Installation of Improved Water Mills	No	300	203	67.66
3	Solar Home System Installation	No	55000	56367	1.02
4	Solar water Pumping for Irrigation and Drinking water	No	100	51	51
5	Institutional Solar Photovoltaic System	No	250	4	1.6
6	Metallic Improved Cookstove Installation	No.	10000	14802	148.02
7	Household Biogas Installation	No.	24000	15628	65.11
8	Community and Institutional Biogas Plant Installation	No.	50	23	46
9	Productive Energy use Promotion	No.	200	72	36
10	Credit Mobilization through Central Renewable Energy Fund	%	28	7	25
11	Rehabilitation activity for earthquake affected MHPs	kW	2000	259	12.92
12	Rehabilitation of earthquake affected household biogas and fibre glass biogas for camps	No.	5000	2190	43.8
13	Solar Mini-grid installation	No.	200	90	45
14	Urban and commercial biogas plant installation	No.	142	78	54.92
15	Solar Dryer/Cooker Installation	No.	50	96	192
16	Battery Management of batteries used for solar PV systems	%	20	0	0
	Total physical progress				**57%**

Annex-3: District Wise Installation of RETs in FY 2074/75 (2017/18)

SN	District	Biogas (Nos.)		Solar (Nos.)					Improved Cookstove (Nos.)			IWM (No.)	MHP (kW)	Wind (kW)	MSME (No.)
		Domestic	Large	SHS & SSHS	ISPS	PVPS	Irrigation	Dryer	Mud	Metallic	IICS				
1	Achham	0		304	7	3				3	3	0	0		6
2	Arghakhanchi	33		347	9		1	1	525	137		0	0		
3	Baglung	6		44	12					364	2	0	0		2
4	Baitadi	3		8	7	1				0	1	0	0		2
5	Bajhang	0		234	5					610	6	0	121.5		2
6	Bajura	0		77	1					1091	8	0	145		
7	Banke	91	2	993	2		55			800		0	0		
8	Bara	147	1	1	0		1			800	1	0	0		
9	Bardiya	263	1	0	2		11			672		0	0		
10	Bhaktapur	5	5	458	11	0	4	12		0	3	0	0		
11	Bhojpur	0		130	1					0	1	0	40		7
12	Chitwan	87		429	6		1	15		0	1	0	0		
13	Dadeldhura	51		678	5					0		0	0		
14	Dailekh	1		356	8	1				716		0	0		
15	Dang	208	1	804	7		7			601		0	0		
16	Darchula	4		927	0					304		0	0		
17	Dhading	311		51	2			1	119	26		9	0		
18	Dhankuta	10	2	1624	1					125		0	0		
19	Dhanusa	93		2906	2					800		0	0		

SN	District	Biogas (Nos.)		Solar (Nos.)					Improved Cookstove (Nos.)			IWM (No.)	MHP (kW)	Wind (kW)	MSME (No.)
		Domestic	Large	SHS & SSHS	ISPS	PVPS	Irrigation	Dryer	Mud	Metallic	IICS				
20	Dolakha	102	1	2	57	0			730	1163	22	0	30		8
21	Dolpa	0		11	0					18		0	50		
22	Doti	0		186	9					3		0	90		
23	Gorkha	541	1	126	42	0				871	1	0	0		
24	Gulmi	5		1089	8		18			1754	6	0	0		
25	Humla	0		0	0					422	30	7	60		1
26	Ilam	93		1	1	3				0		0	0		2
27	Jajarkot	0		0	36					1326	6	2	48		
28	Jhapa	248	23	0	1		5			801	1	0	0		
29	Jumla	0		91	21			1		22	2	0	0	30	
30	Kailali	424	1	400	5	1	10			11		0	0		
31	Kalikot	21		307	12					1271		23	35		
32	Kanchanpur	255		874	2					429		0	0		
33	Kapilbastu	133		1848	2		3			1	1	0	0		
34	Kaski	346	10	0	12					1171	1	0	0		
35	Kathmandu	18	11	352	7	0		4		0	10	0	0		
36	Kavrepalanchowk	236		124	47	0				240	25	0	0		3
37	Khotang	1	3	8	7					0	1	0	0		
38	Lalitpur	4	1	124	0			1		0		3	0		
39	Lamjung	339	11	1	1				105	1084	1	0	0		
40	Mahottari	82		0	3		1			620		0	0		

SN	District	Biogas (Nos.)		Solar (Nos.)					Improved Cookstove (Nos.)			IWM (No.)	MHP (kW)	Wind (kW)	MSME (No.)
		Domestic	Large	SHS & SSHS	ISPS	PVPS	Irrigation	Dryer	Mud	Metallic	IICS				
41	Makawanpur	459		29	4	1				3	1	24	16.5		
42	Manang	0		148	0					1		0	0		
43	Morang	327	15	295	28		13			1519		0	0		8
44	Mugu	0		1	0		5			643	17	0	65		
45	Mustang	0		118	0					1		0	0		8
46	Myagdi	5	1	0	0			42		142	1	0	0		
47	Nawalparasi	121	2	108	10		26	1		132	2	0	0		
48	Nuwakot	147		126	42	0	1			222		0	0		
49	Okhaldhunga	106		277	7	0	6			288	1	0	0		
50	Palpa	110		1	4	6				25		0	0	15	6
51	Panchthar	30	2	2	3	2				0	3	0	40		10
52	Parbat	15		508	0			1		35		0	0		
53	Parsa	6		2412	0		7			800		0	0		
54	Pyuthan	19		3266	11		16		4824	48	2	0	0		4
55	Ramechhap	136		566	43	1				886	2	0	0		
56	Rasuwa	13		3433	10	0				39		0	0		
57	Rautahat	85		2170	3					3255		0	0		
58	Rolpa	49		1268	5	7	10			177	1	0	141.5		8
59	Rukum	0		440	21	5				245	1	0	199.5		14
60	Rupandehi	32		1564	1		7			499		0	0		
61	Salyan	45		1350	18	2				213		0	0		

SN	District	Biogas (Nos.)		Solar (Nos.)					Improved Cookstove (Nos.)			IWM (No.)	MHP (kW)	Wind (kW)	MSME (No.)
		Domestic	Large	SHS & SSHS	ISPS	PVPS	Irrigation	Dryer	Mud	Metallic	IICS				
62	Sankhuwasabha	0		198	0					213	1	0	20		
63	Saptari	77		508	0		9			1884		0	0		
64	Sarlahi	98		1523	2					2326		0	0		
65	Sindhuli	307		358	49	2		13		1656		0	18		
66	Sindhupalchowk	64		156	81	1		5	77	171	3	11	0		
67	Siraha	13		153	4					865		0	0		
68	Solukhumbu	50		1055	1					494		0	15		
69	Sunsari	37	16	2674	5					796		0	0		
70	Surkhet	244	1	623	10	7	2	1		39	1	16	0		8
71	Syangja	254	2	760	17		1			561		0	0		
72	Tanahu	316	7	1053	0					2164	6	0	0		
73	Taplejung	0	1	2879	2					0	3	0	62		8
74	Terhathum	1		394	2					0		0	0		1
75	Udayapur	116	1	22	10		1	2		1506	11	0	15		

Annex-4: Major Deviation of Key Activities

4.1 Targeted RE Program (GoN Financed)

Major deviations of key activities	Reasons for deviations
Community Electrification through Solar Mini-grid Could not be completed	Due to the dispute between community members of the selected project, one project could
Urban Biogas Plant installation	This was pilot project for the urban area and demand could not be received at AEPC.
Feasibility Study of Large Biogas	Due to budget GAP, target could not be completed.
Real time monitoring (performance database) for solar energy	Suitable projects could not be identified to connect in database.
Detail feasibility study of mini/micro hydro projects	AEPC called a notice for the application but the communities submitted the request at last time. So, DFS could not be initiated at end of FY.
Additional Subsidy for Sick projects	GoN has determined certain and specific criteria for seek projects and AEPC could not found the projects as per annual target while assessing the documents received at AEPC for subsidy.
Lighting for Education program (Solar systems for students of 9 and 10 standards belonging to dalits, marginalized, poor, etc)	AEPC called cluster based tender for distribution of solar system received the tender document from bidders. AEPC found some errors in tender documents of two clusters at the time of evaluation. Then evaluation committee cancelled the tender for those cluster and could not be distributed in this FY.
Household Biogas for dalits, marginalized, poor, etc	This programme also was implementing on demand driven approach. AEPC called a notice for the demand collection but could not be received as per the annual target.
Solar energy for vaccine Refrigerator in snake biting treatment centre	This programme also was implementing on demand driven approach. AEPC called a notice for the demand collection but could not be received as per the annual target.
Solar electricity for public school, rural municipality	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector installed system at field over the numbers. So the progress over achieved then annual target.

Major deviations of key activities	Reasons for deviations
Subsidy and credit mobilization for urban solar systems	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector installed system at field over the numbers. So the progress over achieved then annual target.
Productive energy use for dalits, marginalized, poor, etc	At the beginning of the FY, due to the changes in governance system of local level, provision mentioned in SDM brought difficulties to subsidized the RE PEU activities. At the last trimester of FY, AEPC called a notice for the proposal but could not be received any proposal from entrepreneur.
Institutional Improved cooking stove installation in religious places, tourist area, public schools, hospital, health-post and public institution	Due to the low demand from institution, IICS could not be installed as per the annual target.
Renewable Energy for Health Programme (Solar Energy health post, sub-health post, Birthing Centres, Government and community hospital)	It was a special programme for health and there was not subsidy provision in RE subsidy policy for this programme. It took few time to arrangement of subsidy. Later, AEPC called a notice for demand collection but could not be received the demand from institutions.

4.2 National Rural and Renewable Energy Program (NRREP)

Major deviations of key activities	Reasons for deviations
Mini/Micro hydro installation	Mini/Micro hydro construction is ongoing but power output testing of the projects could not be done in the FY. Final achievement counts only after the POT that's why progress shown lower as per annual target.
Installation of Improved Water Mills	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector could not create the demand as expected and installed system at field in few numbers. So the progress could not be achieved as per annual target.
Solar water Pumping for Irrigation and Drinking water	This is a KfW funded programme and kfw proposed AEPC to change the existing guideline for the RSDWP. It took long time to change the mutually agreed guideline so target could not be achieved as per annual target.

Institutional Solar Photovoltaic System	This is a KfW funded programme and kfw proposed AEPC to change the existing guideline for the ISPS. It took long time to change the mutually agreed guideline so target could not be achieved as per annual target.
Household Biogas Installation	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector could not create the demand as expected and installed system at field in few numbers. So the progress could not be achieved as per annual target.
Community and Institutional Biogas Plant Installation	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector could not create the demand as expected and installed system at field in few numbers. So the progress could not be achieved as per annual target.
Productive Energy use Promotion	At the beginning of the FY, due to the changes in governance system of local level, provision mentioned in SDM brought difficulties to subsidize the RE PEU activities. At the, last trimester of FY, AEPC called a notice for the proposal but received few numbers proposal from entrepreneur.
Rehabilitation activity for earthquake affected MHPs	
Rehabilitation of earthquake affected household biogas and fibre glass biogas for camps	Due to the financial gap, target could not be achieved.
Solar Mini-grid installation	Due to delaying on DFS and DPR preparation, construction work could not be start on time and then target could not be achieved.
Urban and commercial biogas plant installation	Due to delaying on DFS and DPR preparation, Installation could not be start on time and then target could not be achieved.
Solar Dryer/Cooker Installation	This programme was implementing on demand driven public private partnership modality and financed as per RE subsidy policy. Private sector create the more demand as expected and installed system at field in high numbers.

Annex-5: Training/Capacity Building Activities by AEPC

SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
1	2-Batches Micro-Hydro Operation training	Community Electrification	22	MH-Operators	50
2	Micro-Hydro Management training -Kathmandu	Community Electrification	7	MH-Managers	25
3	Micro-Hydro Management training -Butwal	Community Electrification	7	MH-Managers	25
4	Pico-Hydro Operation and Management training	Community Electrification	8	PH-Operators	18
5	House wiring training in Rukum	Productive Energy Use	2	MHP user	27
6	Enterprise Development Training	Productive Energy Use	2	Potential Entrepreneurs from 75kW solar mini grid	31
7	Two batches of Mud Stove Masters'Training in Dhankuta and Chitwan	Outreach	7	New Stove Masters	50
8	Training of Trainers/Installers for Installation of Instituitional Improved Cookstoves Models (Khuwa, Lokta and Public Institutions)	Biomass	3	Trainers/Installers	10
9	Vocational Training on House Wiring/Building Electricians	Gender and Social Inclusion	65	Poor, Women, Dalit, Janjati and Vulnerable group of RETs catchment area with school level education.	20
10	Power output and household verification (POHV) training	Monitoring and Quality Assurance	5	Individual Consultant (Engineer)	35
11	Third Party Monitoring Training	Monitoring and Quality Assurance	3	Third Party Consultant	55

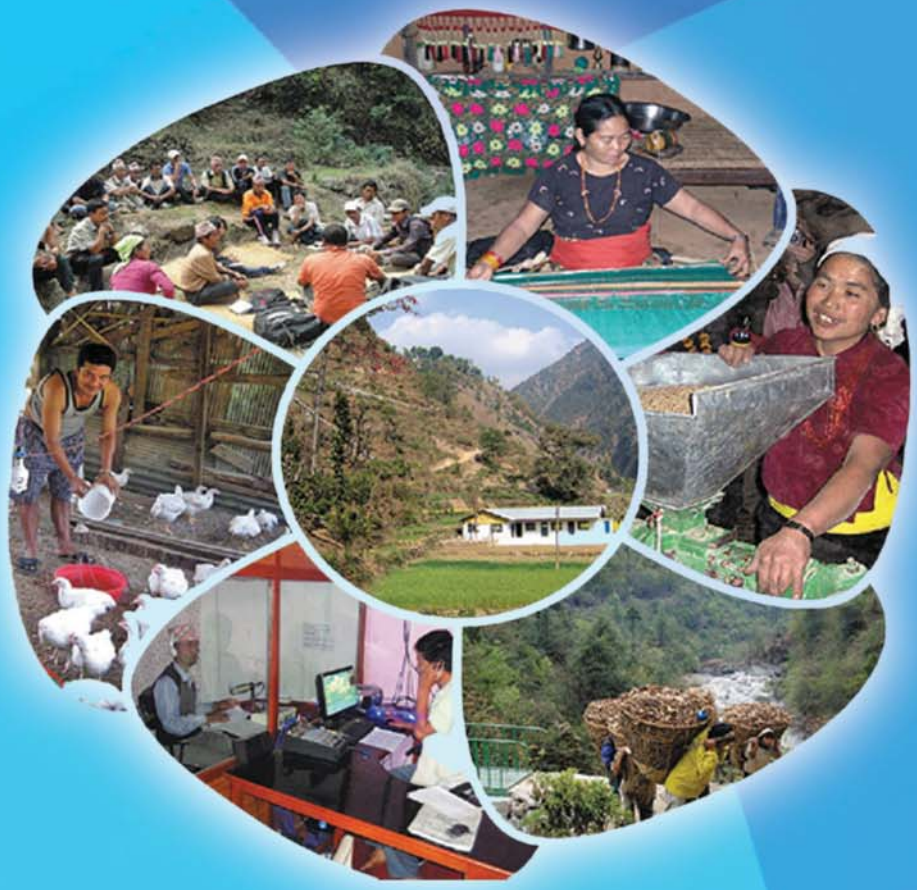
SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
12	Workshop on Scaling Distributed solar PV (DPV) in Nepal: Technical Parameters and Policy Considerations	Solar Energy Section in coordination with The World Bank Nepal office and Clean Energy Solutions Centre, USA.	3	AEPC, DoED, NEA, WECS, RETS, Academic Institutions, and private sector	35
13	2 Batches of Biogas Mason Training (Biogas Technician Level-1)	Biogas Energy Section in coordination with Nepal Renewable Energy Development Company (Pvt.) Ltd. (NREDC)	8	Biogas Mason	50
14	2 Batches of Biogas Supervisor Training (Biogas Technician Level-2)	Biogas Energy Section in coordination with Nepal Renewable Energy Development Company (Pvt.) Ltd. (NREDC)	6	Biogas Supervisor	50
15	One Day Orientation Program on Large Biogas in Kathmandu	Biogas Energy Section in coordination with Nepal Renewable Energy Development Company (Pvt.) Ltd. (NREDC)	1	Biogas Construction Companies	125
16	Organization of National Workshop "Waste to Energy"	Biogas Energy Section	1	Federal, Provincial Parliament Members and local Governments, Experts, Government agencies, Development partners and community leaders.	30
17	Conduction of Promotional Workshop on Large Biogas in 7 Province	Biogas Energy Section	1	Potential commercial entities/ developers of Cow/Piggery/ Poultry/Educational Institutions/ Slaughter houses/Industries owners in the region identified	280

Hon'ble Prime Minister K.P. Sharma Oli in inauguration program of model biogas pipeline gas project in Biratnagar

Hon'ble Minister Barsha Man Pun "Ananta" in inauguration program of Solar Mini Grid Project in Ramite Khola, Morang

Hon'ble Chief Minister (province 7) Trilochan Bhatta in the launching ceremony of RERA program with Ministers, H.E. Roland Schäfer, German Ambassador to Nepal, and AEPC ED in Dhangadhi

Hon'ble Chief Minister (province 1) Sher Dhan Rai addressing the launching ceremony of RERA program in Biratnagar



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