Government of Nepal
Ministry of Energy, Water Resources and Irrigation

Alternative Energy Promotion Centre

Progress at a Glance: A Year in Review FY 2075/76 (2018/19)

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Barsha Man Pun 'Ananta'
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MESSAGE FROM THE CHAIRPERSON

On behalf of the Ministry of Energy, Water Resources and Irrigation, it gives me immense pleasure to extend my felicitation to Alternative Energy Promotion Centre (AEPC) on its 23rd anniversary. Access to clean energy is intrinsic to a high quality of life and kudos to the entire team of AEPC for its continuous devotion towards improving access to clean energy through renewable energy technologies like mini/micro hydropower, solar, wind, biogas and improved cook stoves thereby reducing dependency over traditional and imported energy especially in the rural and remote areas of the country.

The Government of Nepal underpinning it commitment towards the RE sector has formulated the Rural Energy Policy 2006 and various Renewable Energy Subsidy Policies to instigate and promote renewable energy technologies. Considering the need to further strengthen and regulate this emerging sector, the Government of Nepal has initiated the process of drafting the Renewable Energy Act which will clarify roles and provide a legal basis to the sector especially relevant in the changed context of federalism in the country and the Energy Conservation Act which will establish legal and institutional arrangement for promotion of energy efficiency. Similarly, the Climate Change Policy 2019 has been prepared with the objective of contributing to socio economic prosperity by developing climate resilient society while the Nationally Determined Contributions 2015 has focused on mitigating climate change by promoting renewable energy.

On the strategic side, the 15th Plan aspires for a 12% contribution of renewable energy in the total energy consumption by 2080/81 B.S. 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. As renewable energy is a key component in the White Paper of the Ministry, special initiatives have conceived such as Every Home Energy Home on energy efficiency, Mountainous and Upper Hills targeted Solar Mini Grid program, Clean Cooking Solutions earmarking 22 districts of the Terai region, grid connection solar roof top with net metering and net payment system and Every Locality Energy Locality where the government has formulated a policy to establish a challenge fund to develop 100 to 500 kW solar energy technologies at each local level of the country. The White Paper also aspires on developing AEPC as "Centre for Excellence" as national and international knowledge hub in renewable energy in view of achievs of there targets AEPC has a paramount role in assisting the provincial and local level in designing policies, regulations and procedures on renewable energy.

Special thanks goes to the development partners, private sector, civil societies and all the stakeholders for their significant support in the government's endeavors which has invigorated the RE sector to take major actions. Finally, I wish to congratulate AEPC once again for completing 23 glorious years of providing valuable services in rural area and extend best wishes for continued success in the future too.

Barsha Man Pun

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

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MESSAGE FROM THE SECRETARY

As the country strives towards achieving universal access to clean, reliable and affordable energy solutions, the role of Alternative Energy Promotion Center (AEPC) as the nodal government agency for the promotion of renewable energy in Nepal has been indispensable. 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 a blend of renewable energy technologies. Renewable energy is still the most locally accessible and available source of energy in remote areas which in turn contributes in reducing deforestation, reducing carbon emission, ensures reliable power supply and diversification, enhances energy security and reducing the dependency on the imported fossil fuel. AEPC has been contributing towards achieving the national goal for balanced regional development throughout the country by providing energy services in geographically and socio-economically remote areas of the country.

Hitherto, AEPC has taken the leading role for promotion and development of the renewable energy in Nepal. AEPC has generated about 55MW electricity through mini grids and off-grid electrification solutions. The dissemination and promotion of clean lighting and cooking solutions have had a substantial impact on the quality of living of the local communities in rural and remote areas of Nepal. Correspondingly, cross-sectoral implementations in health, education, water treatment and lifting, public services and other productive end uses have greatly enhanced access to services for livelihood improvement of local population. Nevertheless these major accomplishments, there are large areas devoid of modern energy services and the renewable energy technologies have huge potentials to fulfill the chasm.

The 15th plan aspires for a 12% contribution of renewable energy in the total energy and aims to provide access to electricity to the additional 5% of the total populations and envisages to install 0.2 million household biogas plants and 0.5 million improved cooking stoves and thermal gasifiers, 20 thousand metric ton annual production of bio briquette and pellets, 2 more carbon projects under its belt and annual replacement of 40 thousand metric ton of liquefied petroleum gas through installation of 500 large biogas plant. AEPC has to prepare itself to deliver these targets. Furthermore,preparation should start from now to take the sector into the next generation in terms of grid interconnection, clean cooking, scaling up of technologies, sustainability of systems, accessible renewable energy finance and an integrated energy planning. For this, the government is committed for a policy environment conducive for technology transfer, attracting private investment and commercial financing into the sector and will support local and provincial government to achieve the national goal of providing energy access to all.

I am extremely delighted to express my gratitude and to share the achievements of AEPC. I would like to congratulate the entire team of AEPC, external development partners and stakeholders for completing 23 illustrious years of delivering services to the rural and remote communities of Nepal and wish for continued effort and profound spirit in forthcoming years.

Dinesh Kumar Ghimire
Secretary (Energy), Ministry of Energy, Water Resources and Irrigation
and Member, Alternative Energy Development Board

ALTERNATIVE ENERGY PROMOTION DEVELOPMENT BOARD

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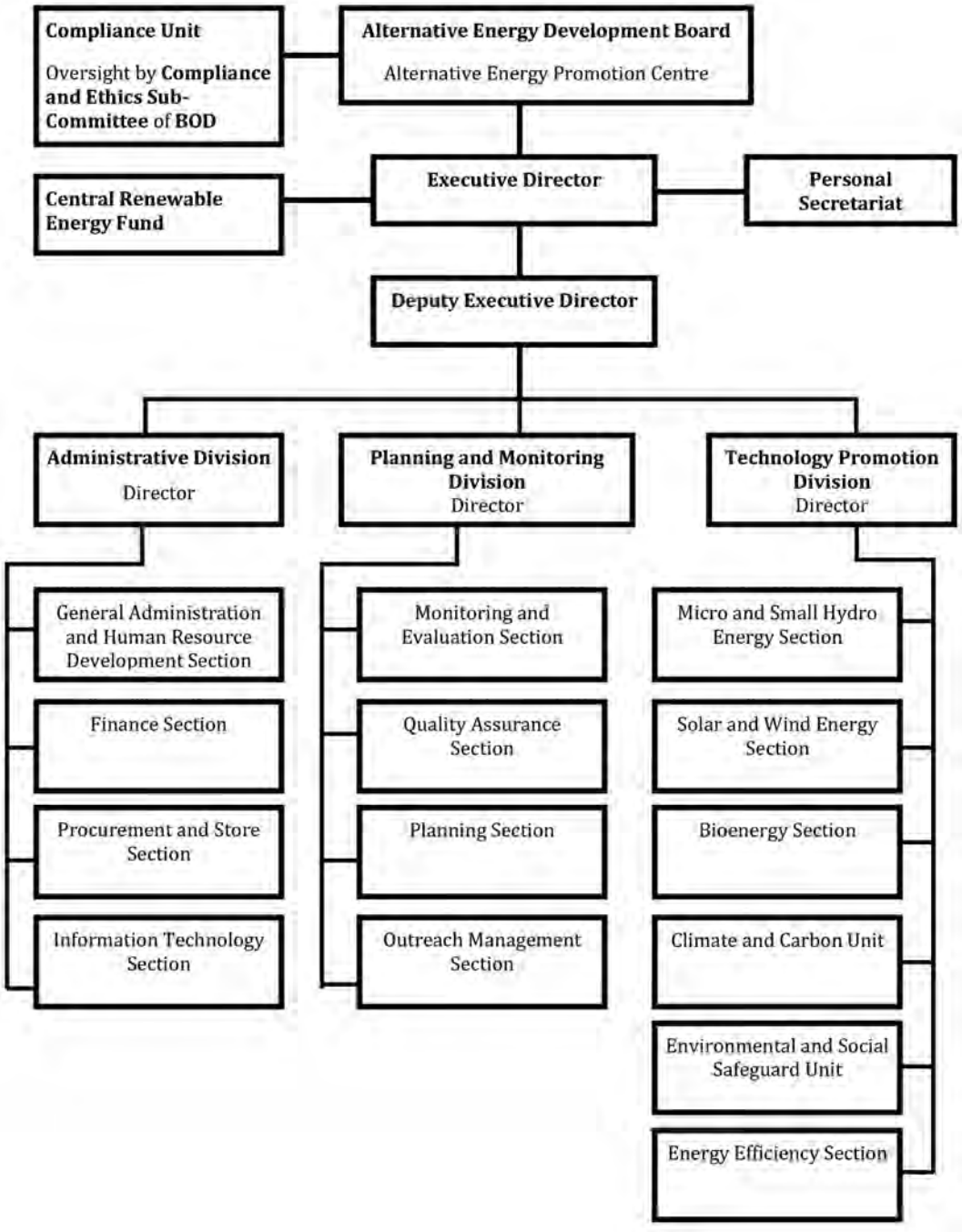
Member
Representative, NGO Sector

Vacant
Member
Representative, Private Sector

Mr. Madhusudhan Adhikari
Member Secretary
Executive Director, AEPC

ORGANIZATIONAL STRUCTURE



EXECUTIVE DIRECTOR'S REPORT

Alternative Energy Promotion Centre (AEPC) established in November 3rd, 1996 under the aegis of Development Act 2013 BS with the mandate of promoting renewable energy technologies in rural areas of Nepal has rapidly evolved into a nationally and internationally recognized entity working in the area of renewable energy technologies and climate change mitigation and adaptation. Moreover , energy efficiency is the new mandate given by the Government of Nepal to AEPC where we seeks to harness our experience gained in the renewable energy sector and galvanize the Nation to adopt measures to address the predominant energy poverty and ever increasing import of fossil fuels.

Nepal's Constitution confers its citizen with the right to reliable and affordable energy supply. The 15th plan aspires for a 12% contribution of renewable energy in the total energy consumption by 2080/81 B.S. Similarly the plan aims to provide access to electricity consisting of 13 megawatts of micro and mini hydropower, 127 megawatts of solar and 10 megawatts of wind energy to the additional 5% of the total populations to implement climate change adaptation plans at 550 local levels from the existing 217. The plan further envisages to install 0.2 million household biogas plants and 0.5 million improved cooking stoves and thermal gasifiers, 20 thousand metric ton annual production of bio briquette and pellets, 2 more carbon projects under its belt and annual replacement of 40 thousand metric ton of liquefied petroleum gas through installation of 500 large biogas plant. 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 on Mountainous and Upper Hills targeted Solar Mini Grid program, Clean Cooking Solutions at designated 22 districts of the Terai region and develop AEPC as "Center of Excellence" in renewable energy and also has prioritized the establishment of national carbon market for renewable energy.

As we approach our 23rd anniversary, we reflect on our many accomplishment and limitations as we plan forward. The continuous financial and technical support of the Government of Nepal, development partners, the dedication of our staff and the fervor of private sectors and local communities have contributed tremendously to the achievement of our ambitious goals. In this journey, AEPC has supported over 14 million people across country realize their renewable energy needs through appropriate deployment of technical supports, subsidy and credits. At present about 500 private companies and umpteen numbers of local communities are leading the service delivery front creating direct and indirect employment opportunities to over 30,000 people.

Over twenty three years, AEPC has been delivering services while creating a conducive policy environment for the participation of private sector and non-governmental organizations for promotion and development of renewable energy sector. AEPC has successfully implemented the National Rural Renewable Energy Program (NRREP) and currently, AEPC is implementing Scaling Up Renewable Energy Program (SREP) for commercial-scale large biogas, South Asia Sub-regional Economic Cooperation (SASEC) in off grid areas for enhancing access to renewable energy services, Renewable Energy for Rural Livelihood (RERL) for large micro hydropower, mini hydropower, large solar PV and productive energy use, Nepal Mini Grid Project (MGEAP) for mobilizing energy services companies in selected regions for increasing the capacity of renewable energy mini grids and Nepal Renewable Energy Programme (NREP) for building capacity to lead and manage the National Renewable Energy Framework and for strengthening the capacity to manage and spend climate finance. AEPC, with support from development partners and other stakeholders, has been able to generate more than 55MW of electricity, mostly in off-grid rural areas, through renewable energy resources till date.

The reporting period was the second year after the completion of the five year National Rural and Renewable Energy Programme (NRREP) supported by multiple development partners with Danish and Norwegian in the lead. After the completion of NRREP and exit of the lead donors, the government continued NRREP from its own resources and other development partners in its second year as well. 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 113% physical progress and 80% financial progress. Similarly, the initiatives planned under NRREP achieved 66% physical progress and 48% financial progress. Solar Electrification projects completed during the reporting period ensured access of electricity to more than 75,000 households, MHP's generated more than 1600 kW of electricity and Wind-Solar hybrid systems have generated 30 kW of electricity. Similarly, ICS and biogas technologies were instrumental in providing 56,000 households with clean cooking solutions. Besides technology promotion, AEPC holds eight Clean Development Mechanism (CDM) projects/ programs in its portfolio. Reporting period marked issuance of around 0.6 million CERs while generating 2.29 Million USD through the transaction of the issued credits. The reporting marked history with the 22nd Board of the GCF (Green Climate Fund) deciding to accredit AEPC as the direct access entity (DAE) making AEPC the first entity in Nepal to achieve GCF's accreditation. AEPC now stands at the verge of signing the Accreditation Master Agreement with GCF and we pledge to seek GCF funding to materialize its implementation in the near future.

On the institution side, Environment and Social Safeguard Unit (ESS) has now reached its second year and periodic ESS reviews have been instilled in the entity's culture. To streamline the GESI related activities, GESI policy of AEPC drafted in the previous reporting period has been approved by the AEPC board. GESI has been an intrinsic part of AEPC's work culture, reflected through our GESI responsive RE policy, Annual Budget and Work Plan, Additional Subsidy and Credit Facilities. Compliance unit, established at AEPC to strengthen its internal control and system improvement completed its second year with a restructured Compliance and Ethics Sub-Committee consisting of five members including two external legal and finance expert ensuring a more balanced and independent oversight approach, development of Financial Discipline and Good Governance Regulation and Financial Mismanagement and Corruption Prevention Resource Book encompassing procedures for grievance handling, reporting and investigations has further bolstered AEPC's commitment towards accountability and integrity. In the previous year, outreach function at AEPC established two Project Implementation Units (PIU) at Province1 and Sudoorpaschim Province of Nepal in coordination with provincial Ministry of Physical Infrastructure and Development and with support from Renewable Energy for Rural Areas (RERA). This year Memorandum of Understanding have been signed with all the seven provinces and technical resources have been deployed to provide necessary support to the provincial governments for the development and expansion of renewable energy.

Renewable energy technologies promoted during the reporting period helped in achieving 0.08 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.

As the Nation transitioned from the unitary system to federalism, this progression to the federal setup offers both challenges and opportunities to AEPC. It is vital that AEPC reposition itself striving towards the centre of excellence assisting in formulating policies, regulatory frameworks, strategies and plans. AEPC will have a strong role in supporting provincial and local governments to plan, facilitate financing, monitor and evaluate renewable energy initiatives in addition to capacity building, quality assurance and innovation. In this context, AEPC sees itself having an immensely important role to carrying out research and studies on distribution of grants related to renewable

energy between federal, provincial and local level governments. Furthermore, in the current context, AEPC will predominantly work in the areas of Energy Efficiency, Utility Scale Grid Connected Solar PV System, Large Biogas, and Waste to Energy Projects ensuring proportionate and reliable energy mix.

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 important before and in the present climate, this is even more imperative, now. Hence, promulgation of Act to ensure the legal stability of AEPC remains vital.

Finally, AEPC greatly appreciates the role of the ministry in taking ownership of AEPC's agenda and the role of development partners for their continued support and cooperation. I firmly believe that together we can ascend to greater heights serving the nation and making the difference where it matters the most.

Mr. Madhusudhan Adhikari
Executive Director, AEPC

ABBREVIATION AND ACRONYMS

AEPC	Alternative Energy Promotion Center
AEDB	Alternative Energy 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
DOE	Designated Operational Entity
DoED	Department of Electricity Development
DP	Development Partners
EDP	External Development Partners
EE	Energy Efficiency
ESCOs	Energy Service Companies
ESS	Environmental and Social Safeguards
FY	Fiscal Year
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESI	Gender and Social Inclusion
GHG	Greenhouse Gas
GIS	Geographic Information System
GoN	Government of Nepal
ICS	Improved Cooking Stoves
IEA	International Energy Agency
ISPS	Institutional Solar Photovoltaic System
IWM	Improved Water Mills
KfW	German Development Bank
kW	Kilowatt
kWh	Kilowatt Hour
LFI	Local Financial Institutions
LPG	Liquefied Petroleum Gas
MEP	Municipal Energy Plan
MGEAP	Nepal Private Sector-Led Mini Grid Energy Access Project
MHDF	Micro 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
MuAN	Municipal Association of Nepal
MW	Megawatt

NAMA	Nationally Appropriate Mitigation Action
NARMIN	National Association of Rural Municipality in Nepal
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
NREP	Nepal Renewable Energy Program
NRREP	National Rural and Renewable Energy Program
PEU	Productive Energy Use
PoA	Program of Activities
PPP	Public Private Partnership
PVPS	Photovoltaic Pumping Systems
RA	Reverse Auctioning
RE	Renewable Energy
RERA	Renewable Energy for Rural Areas
RERL	Renewable Energy for Rural Livelihood
RET	Renewable Energy Technology
RSC	Regional Service Center
RTSP	Regional Technical Service Provider
SAMS	Subsidy Administration Management System
SASEC	South Asia Sub-regional Economic Cooperation
SDG	Sustainable Development Goals
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

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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 81% of the global energy supply contributed by the Oil, Coal and Natural Gas in 2017[1]. 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 2 %[2]. This suggests that there are still avenues to decouple energy production from conventional sources.

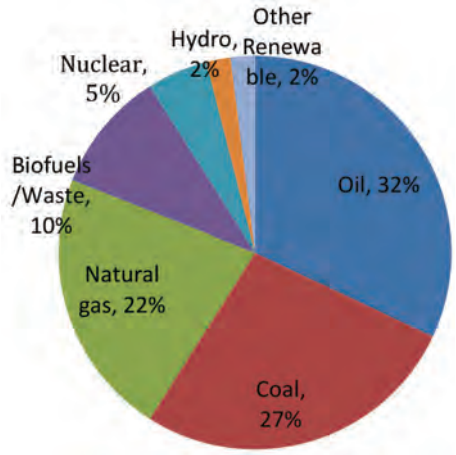

Figure 1: World total primary energy supply by fuel, (Key World Energy Statistics, IEA 2019)

1 World Energy Balances: Overview (2019 edition), https://www.iea.org/statistics/balances/

2 World Energy Balances: Overview (2019 edition), https://www.iea.org/statistics/balances/

Global electricity consumption from 2000 to 2013 has increased almost by 1.5 times (12,116 TWh to 19,504 TWh)[3] while the access to grid electricity increased to 85.19% from 77.29% in 2000[4]. 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 (39 million) and gross domestic product (GDP) growth rate of 4.5% (the Business-as-Usual Scenario) for 2040 stands at 1536 kWh. At the GDP growth rate of 4.5% and with reference year of 2015, annual electricity forecast for 2020 is expected to roughly double (from 138 kWh to 271 kWh). The projection of per capita electricity consumption in the business-as-usual (BAU) scenario from 2015 to 2040 is presented in figure 2[5]. This projection demands enhanced generation of electricity through all available means.

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

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

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

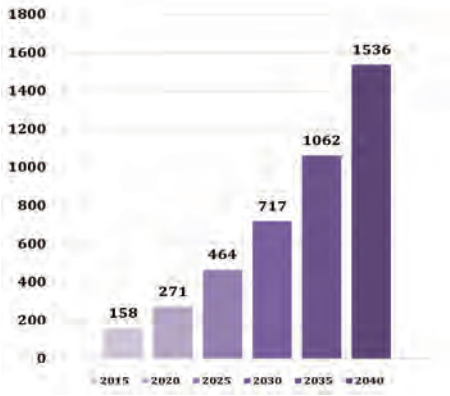

Figure 2: Projection of Energy Consumption for 2015-2040 in kWh, (adapted from WECS, 2017)

1.2 NATIONAL ENERGY CONSUMPTION SCENARIO

Residential sector (households) is the primary consumer of energy in Nepal. Household energy consumption as per the Economic Survey 2075/76 B.S. (2018/19) stood at 42.6% in the first eight months of the FY 2018/19 followed by Industrial sector (38.3%). The households in the country have more affinity towards solid fuels (fire woods) as primary fuel for cooking followed by the use of Liquefied 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 coking. Energy consumption mix in the first eight months of the FY 2018/19 depicts high dominance of traditional fuels (68.6%). Figure 3 presents the energy consumption scenario by fuel type in first 8 months of FY 2018/10 (Economic Survey 2075/76 B.S., MoF).

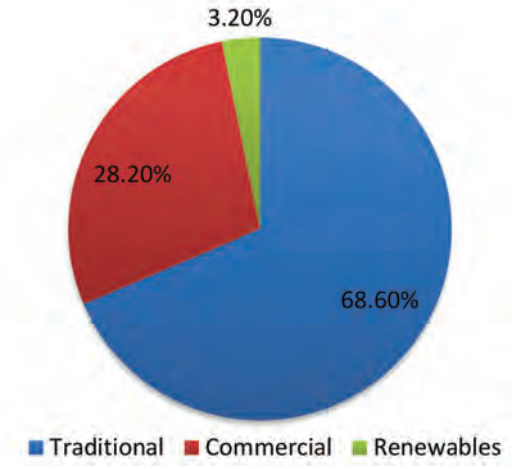

Figure 3: Energy Consumption by Fuel type 2018/19 first eight months, (adapted from MoF, Economic Survey, 2075/76)

1.2.1 National Electrification Status Access

Based on an analysis by AEPC to review and update the percentage of population having access of electricity till date, actual contribution in electricity access through RE (Solar and Micro hydro) is 6.25+3.5=9.75%, taking NEA grid access to 77.8% and total electricity access is 87.55%. Hence, 12.45 % population lacks electricity access.

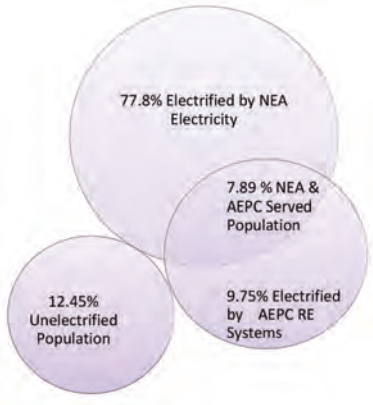

Figure 4: Contribution of Electricity Access through NEA and AEPC

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 (1992-1997) 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 (1997-2002), 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 Center (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.

The Fourteenth periodic plan (2016-2019) aspired to reach additional 9% of population with electricity from solar, hydro (mini and micro) and wind resources. The 14th plan also aimed to promote 0.2 million units of biogas digester and 1.065 million units of improved cooking stoves (NPC, 2016)[6].

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[7]. 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) focuses on reducing 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 (2019) adopts the goal of contributing to socio economic prosperity by developing climate resilient society. Following a theme based approach in eight thematic areas of (i) agriculture and food security (ii) forest, biodiversity and watershed conservation (iii) water resources and energy (iv) rural and urban settlement (v) industry, transport and physical infrastructure (vi) tourism, natural and cultural heritage (vii) health, drinking water and sanitation (viii) disaster risk reduction and management and four cross cutting areas of (i) gender and social inclusion, livelihood and good governance (ii) Increased public awareness and capacity development (iii) Research, technical development and dissemination (iv)climate finance management . It aims at advancing capacity on climate change adaptation, promoting green economy, mobilizing national and international climate finance, formulating strategies, regulations and guidelines at all three tiers of government The current policy released on August 2019 supersedes the Climate Change Policy 2011 of Nepal which had 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. .

RE Subsidy Policy and Subsidy Delivery mechanism (2016) focuses on the utilization of Best Available Technology (BAT) and Reverse

6 National Planning Commission (NPC), 2016: The Fourteenth Plan (2016/17-2018/19)
7 The Constitution of Nepal (2015)

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 Contributions (NDC) (2016) of Nepal focuses on the promotion of renewable energy and energy efficiency for the adaptation and mitigation of climate change. The process revising the NDC 2016 has been initiated.

Fifteen periodic plan has been adopted by the GoN in FY 2019/20 and up until 2023/24 The approach paper for the fifteenth has been formulated and a detailed plan document in under preparation. The plan aspires to for a 12% contribution of renewable energy in the total energy and aims to provide access to electricity to the additional 15% of the total populations and envisages to install 0.2 million household biogas plants and 0.5 million improved cooking stoves and thermal gasifiers, 20 thousand metric ton annual production of bio briquette and pellets, 2 more carbon projects under its belt and annual replacement of 40 thousand metric ton of liquefied petroleum gas through installation of 500 large biogas plant.

Biomass Energy Strategy (2017) aims to 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 production of Biomass energy

National Renewable Energy Framework (2017) aims to cover 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-centered 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.

National Energy Efficiency Strategy (2018) approved by the GoN's cabinet meeting on November 19, 2018 sets its vision to assist in the energy security by increasing the energy access through efficient use of available energy, mission to promote energy efficiency by effectively implementing energy efficiency programmes through establishing policy, legal and institutional framework and the goal to double the average the improvement rate of energy efficiency in Nepal from 0.84% per year, which existed during the period of 2000-2015 to 1.68% per year in 2030 A.D.

The Nepal Government's budget for FY 2019/20 concentrates its efforts on various renewable energy promotion programs such as installation of solar energy systems at rural municipalities

and the ward offices lacking access to the national grid, installation of solar energy based oxygen concentrator at tourist areas, smoke-free homes program to the dalits, poor, marginalized communities residing above 1500 meters from the sea-level. Productive energy use promoting entrepreneurship and installation of bio gas plants for the disadvantaged households and communities. Furthermore, priority have been given to Himali and Uccha Pahadi Solar Mini Grid Installation Program, Installation of solar home systems for the disadvantaged groups throught the Clean Energy Program, Ujyalo Nepal Program focusing on installation of Solar Mini Grids for the areas lacking access to electricity and promotion of clean energy and clean cooking solutions at Terai region by replacing traditional dung cakes and implementation of clean energy program at the areas lacking electricity . Similarly, it has given the focus to electricity generation through micro and mini hydro, domestic, urban and commercial biogas plant installation, Solar drinking water and pump installation program for irrigation purpose, institutional solar energy system, wind energy project in public private partnership , solar rooftop and grid connected solar promotion program and extensive support to areas lacking electricity belonging to Province 2, Karnali Province and Sudoorpaschim Province of Nepal.

The white paper of Ministry of Energy, Water Resource and Irrigation (2018)[8] 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 people. 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.

8 White Paper of Ministry of Energy, Water Resource and Irrigation


ALTERNATIVE ENERGY PROMOTION DEVELOPMENT BOARD
ALTERNATIVE ENERGY PROMOTION CENTRE
वैकल्पिक ऊर्जा प्रवर्द्धन केन्द्र

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 Development Board (AEDB) 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. The Seventh Amendment of the AEPC Formation Order 2053 (1996) has broaden the functions of AEPC exclusively specifying the implementation of energy efficiency development programmes at the provincial and local level mobilizing national and international resources along with implementation of programs and projects on climate change and carbon emission reduction.

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. 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 5: PPP Model of Renewable Energy Service Delivery

After the promulgation of the new constitution and state restructuring into the federal system, AEPC has been concentrating its efforts to establish provincial setups (7 provinces) and local setups (753 local governments). The reporting period witnessed the signing of MoUs with Ministry of Physical Infrastructure Development (MoPID) at all the 7 provinces, 14 local governments of Province 1 and Sudoorpaschim Province, National Association of Rural Municipality in Nepal (NARMiN) and Municipal Association of Nepal (MuAN).

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. AEPC is also involved in accessing different international climate and environment funds. Recently, AEPC has been accredited as the Direct Access Entity of the Green Climate Fund (GCF) enabling it to access climate finance from the GCF. Further AEPC has been regularly involved in developing project concepts and proposals to increase the access to the available international climate finance resources.

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, 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.

Furthermore, expanding the achievements on Grid Connection of MHP through the development of the technical standard for grid connection formulated in 2014, in the FY 2075/76, two more MHP's namely Sobuwa Khola MHP of Taplejung (90kW) and Midim Khola MHP of Lamjung (100kW) were connected to the national grid tallying up to 4 MHPs with the total capacity of 253 kW have so far been interconnected with the grid.

2.2.3 Outreach

The role of outreach in the current federal context is pivotal. The advent of federal structure transforming the governance structure with three tiers of government i.e. federal, provincial and local implied that AEPC outreach modality needed an overhaul. Hence, the outreach function at AEPC has aptly assisted in signing Memorandum of Understanding (MoU) with all the seven provincial levels, concentrates it efforts of capacity building and orientation on RE at the provincial and local level and ultimately providing technical assistance to the provincial and local level in designing, developing, implementing and monitoring Renewable Energy Programs.

In order to assist the local governments, AEPC has prepared methodology to develop Municipal Energy Plan (MEP), with inputs from municipalities and development partners. The MEP focuses on provision of clean cooking and lighting solutions for all by 2030, energy for community services such as health centers and schools and enterprises. The methodology helps identify the least cost solutions for a set of particular energy service/s considering the life cycle cost of different energy options such as grid extension, mini/micro hydro, solar PV/thermal, biogas and biomass.

2.2.4 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. For the sustainability of any renewable energy project, productive energy use has an important role in increasing 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. Thus the energy components and the productive energy use complement each other.

2.2.5 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 Management 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.

In the reporting period with support from GIZ/RERA, a revolving credit fund has been established and operationalized for financing renewable energy systems through Banks and Financial Institutions.

2.2.6 Compliance and Ethics

AEPC has established the Compliance Unit across the entire organization through the decision of the Board dated 04/01/2016 AD (20/09/2072 BS) to serve the oversight function for AEPC and to ensure the adequacy of internal controls at the institutional level. The oversight of the Unit is be done by a five member sub-committee "Compliance and Ethics Sub-committee" headed by one Board member to oversee the internal control, ethics and internal audit of AEPC. Other members of the sub-committee are joint secretary from the legal department and under-secretary from the finance section of the line ministry, independent legal expert and independent finance expert. The Compliance Unit through this sub-committee directly reports to the Board on a periodic basis highlighting the improvement needs to ensure proper functioning of the internal controls.

2.2.7 Environment and Social Safeguards

AEPC has brought in to affect the Environmental and Social Safeguards (ESS) policy adhering to the Nepal's Environment Act and Environment Protection Rules to ensure that the environmental and social impacts are minimized to the extent possible through appropriate mitigation measures. The key principle set out in the policy aims to avoid, reduce and mitigate any harm to the environment and society by incorporating environmental and social concerns as integral part throughout AEPC's project cycle.

2.2.8 Energy Efficiency

Following the adoption of National Energy Efficiency Strategy 2018, AEPC has been designated as the energy efficiency entity of the GoN. AEPC is tasked to promote energy efficiency (EE) in Nepal and coordinate between national institutions and stakeholders involved in the programs and activities related to EE. In FY 2075/76, Business Plan of AEPC on Energy Efficiency has been developed, drafted the concept note on Energy Management Information System, procurement of energy audit equipments, stock taking of energy efficiency programs were carried out at the national and provincial level for development, dissemination and feedback collection on Energy Efficiency and Conservation Bill. The GoN is taking this forward by preparing National Energy Efficiency Action Plan and finalization of the Energy Efficiency and Conservation Bill.

2.3 HUMAN RESOURCE

Currently AEPC has 54 permanent staff positions. 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 emerged as a proactive institution in

delivering renewable energy services to targeted beneficiaries. AEPC has remained in the forefront supporting government to formulate necessary plans, policies and strategies required to mainstream renewable energy supply in Nepal and in making climate change mitigation and adaptation a national priority. AEPC has closely contributed in formulating the following key policy and strategic documents:

- Rural Energy Policy, 2006
- Periodic Plans (focusing on RE and Climate Change)
- 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
- National Energy Efficiency Strategy, 2018
- Climate Change Policy, 2019
- Renewable Energy Policy (Draft), 2014
- Low Carbon Economic Development Strategy (Draft), 2014

2.5 CUMULATIVE ACHIEVEMENTS

AEPC has ably promoted renewable energy across all available technological measures, both in the rural and urban areas. In over 23 years of its establishment AEPC has supported over 14 million people (a single beneficiary may have been counted up to four times based on the number of different RETs provided) 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 creating direct and indirect employment opportunities to over 30,000 people. The figure 7 depicts the number of renewable energy technologies promoted by AEPC in the reporting period.

Table 1: Cumulative achievement in technology promotion

Program	Unit	Achievements till FY 2018/19
Mud Improved Cooking Stoves (ICS)	Nos.	1,423,242
Solar Home System	Nos.	911,097
Domestic Biogas	Nos.	425,511
Micro/Mini Hydro	KW	32,159
Institutional Solar PV System	Nos.	1,993
Metallic ICS	Nos.	85,805
Improved Water Mill (IWM)	Nos.	11,018
Urban Solar Home System	Nos.	21,144
Solar Drinking Water and Irrigation Pump	Nos.	1,364
Solar/Wind Min-grid System	KW	563
Large Biogas Plant	Nos.	247

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 EDPs ever since its establishment. Effort 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


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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, renewable energy for DAGs including the smoke free homes program, Energy for health and education, energy for irrigation and agriculture, renewable energy for tourism, bio gas pipeline and bottling and renewable energy at local levels, religious institutions, schools, hospitals and public institutions,

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. The government has continued NRREP from its own resources and other development partners. CREF, established as the financial intermediation mechanism mobilizing subsidies and credits in renewable energy through a set of banking and financial institutions, has also been continued.

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 dollar. 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 mini-grid, 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 projects.

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:

1. Strengthen renewable energy institutions primarily the AEPC at the centre and at the district level removing barriers to successful deployment of renewable energy technologies and services.
2. Enhance the renewable energy related policy and regulatory framework.
3. Improve access to financing by providing subsidy supports to the community based micro hydro schemes.
4. Promoting sustainable livelihoods by establishing energy based micro enterprises.
5. Supports to internalize lessons learnt and best practices to formulate and implement rural/renewable energy policies and regulations at the central level.

In FY 2075/76, RERL supported in the development of Municipal Energy Plans, assisted in the development of the Utility Scale Solar PV Development Guideline, establishment of financial instruments such as Vendor Financing Mechanism, Vendor Challenge Fund and Credit Guarantee Mechanism

to de-risk private investments, development of mini hydro and solar mini grid projects and micro financing activities for women of mini hydro projects.

3.3.4 Promotion of Energy Efficiency and Renewable Energy-Component 2 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 central, 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 is supporting the local government bodies in this decentralization of government services in the energy sector. RERA is capacitating 14 partner municipalities in Province 1 and Sudoorpaschim Province and the Ministries of Physical Infrastructure Development in these provinces to establish the institutional set-up for promotion of RE, and to plan, budget and implement RE promotion. Additionally, RERA assists the transformation of AEPC from a central implementing agency to a service agency that supports sub-national governments in their delivery on RE. To unlock innovations in the RE sector, RERA also engages in mobilizing private finance and credit, as well as by piloting innovative business models and technologies. 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.

3.3.8 Nepal Renewable Energy Program (NREP)

NREP is a four and half year programme with the total value of £ 9.2 million funded by DFID under the aegis of Climate Smart Development for Nepal , implemented by DAI Europe and Winrock International in collaboration with AEPC. NREP aims to deliver a series of programmes activities in line with four objectives:

1. Build the capacity of Government of Nepal to lead and manage the NREF. AEPC will be the main entry point but other relevant institutions may also be considered (such as AEPC provincial offices, the Ministry of Energy, Water Resources and Irrigation (MoEWRI), Ministry of Physical Infrastructure and Development (MoPID) at province level, Nepal Electricity Authority (NEA), etc.).
2. Strengthening the capacity of CREF to enable it to manage and spend climate finance.
3. Directly deliver programme activities related to: (i) demand for renewable energy; (ii) supply of renewable energy technologies; and (iii) finance for renewable energy.
4. Generate and share knowledge and research in relation to Nepal's renewable energy sector. Develop networks of partners working in the sector and facilitate knowledge sharing and learning

3.3.9 Nepal Private Sector-Led Mini Grid Energy Access Project (MGEAP)

To improve and sustain the off-grid electricity supply model, it has realized the need to encourage a private sector-led model with private sector management and financing. So, to promote commercial financing and increase private sector participation in the operation and management of mini-grids, the Government of Nepal has signed an agreement with the World Bank to implement "Nepal: Private Sector-Led Mini Grid Energy Access Project (MGEAP)". The main objective of MGEAP is to increase electricity generation from renewable energy mini-grids (Solar, Wind, Solar/Wind Hybrid and Micro/ Mini Hydro) in selected areas by mobilizing Energy Service Companies (ESCOs). Renewable energy mini grid subprojects eligible for participation in Mini Grid Energy Access Project (MGEAP) include:

1. Greenfield mini grid subprojects: subprojects with the cumulative capacity of 2.8 MW
2. Up gradation of mini grid subprojects: subprojects with the cumulative capacity of 0.5 MW
3. Grid interconnection of mini grid subprojects: subprojects with the cumulative capacity of 0.5 MW

CHAPTER 4: PROGRESS OVERVIEW

In FY 2018/19, AEPC implemented renewable energy technologies through two separate windows: the targeted renewable energy program solely financed by GoN; and NRREP jointly financed by the GoN along with other EDPs. During the reporting period programs implemented under targeted RE program achieved 113% physical progress against 80% financial progress. Similarly, for NRREP the physical progress stood at 66% against the financial progress of 48%.

Table 3: Annual progress of AEPC implemented programs

SN	Programs	Progress	Value
1.	Targeted RE program (GoN Financed)	Physical	113%
		Financial	80%
2.	NRREP	Physical	66%
		Financial	48%

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 52% 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. GoN allocated 25% of the total budget for NRREP in FY 2018/19.

The total budget allocated for AEPC in both the routes in FY 2018/19 was NPR 3511.92 Million out of which the expenditure was NPR 2087.19 Million. The overall financial progress of AEPC including both the program in the FY 2018/19 stood at 59%. Financial progress of targeted RE program implemented by AEPC during the review period stood at 80% whereas the progress under the NRREP remained around 48%.

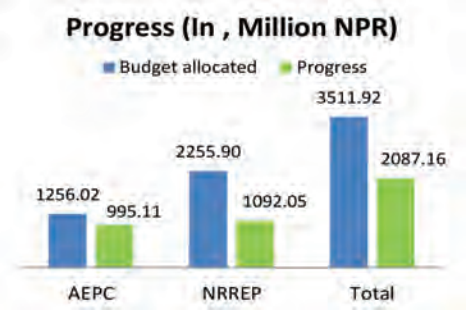


Figure 6: Budget allocated and the progress (in million NPR) (FY 2018/19)

Figure 7: GoN allocation and Foreign Investment (Grant and Loan) in total RE budget

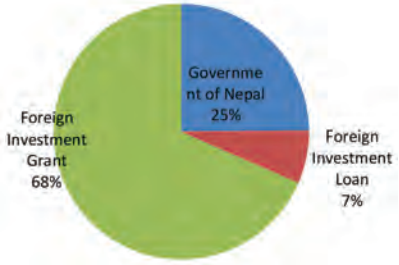


Figure 8: GoN allocation and Foreign Investment for NRREP

4.2 PHYSICAL PROGRESS

Physical progress of AEPC fund was stood at 113% whereas the physical progress of the activities implemented under NRREP stood at 66% 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.

Similar to the previous year, physical progress of NRREP achieved during the reporting period was not too promising. Due to the delay in approval of spending procedures and guidelines on programs in collaboration with development partners and institutions, the implementation of the approved budget and programs witnessed low progress. In case of other annual programs, inadequate skilled human resources and access affected by harsh geographical conditions, closures and strikes are the main reasons behind not achieving its targets. Further the transition of entire governance under the new federal structure has affected the pace of the activities

4.2.1 Mini & Micro Hydro and IWM Related Activities

The work plan of the FY 2018/19 targeted to produce 2000 kW of electricity through Mini/Micro hydro power. In the review period, 1453 kW electricity was produced from the Mini/Micro-hydro standing with a progress of 48.43 %.

There was plan to rehabilitate the MHPs with total capacity of 2000 kW which were affected by the 2015 earthquake but MHPs with total 157 kW capacity only could be rehabilitated during the review period.

Similarly, support (technical and additional subsidy) was provided to 15 sick/un-completed MHPs to complete the installation of those MHPs. The target for the same in the review period was 20. Regarding the grid connection of the MHPs, out of the target to connect the 5 MHPs in the, 2 were met. Of the 15 detail feasibility studies planned, progress was achieved for 35 MHPs, exceeding the target. Regarding the detail feasibility studies through pumping for irrigation planned, target of 10 was entirely met.

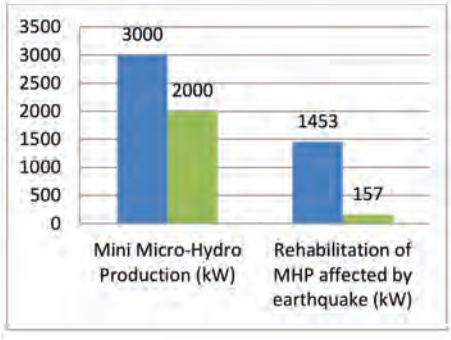


Figure 9: Progress of key micro hydro related activities

Figure 10: Powerhouse at Lagagad MHP, Kalikot, 85 kw, Pachaljharana

In case of IWM technology, of the total systems planned for deployment, 80.5% progress was achieved (161 installed against the plan of 200 IWMs). IWM technology implementation modality witnessed a transition during the review period.

4.2.2 Solar Energy Related Activities

Progress on activities related to solar energy promotion witnessed mixed results; while most of the target set for the promotion of solar energy based technologies were over achieved and few remained under achieved. The targets related to installation of solar irrigation system at the National Canal System, roof top solar grid connection, solar PV and thermal installation at community old age homes and battery management remained unachieved. Installation target related to agriculture irrigation through solar pumps, institutional solar PV at rural municipalities, ward offices, community schools, health post and other public institutions, solar street light at religious abodes and installation of solar home system largely remained over achieved The clean energy program targeted to the disadvantaged communities and the solar mini grid installation have been successful in meeting the stated targets. While the targets related to solar drinking water and irrigation and solar dryer and cooker, remained underachieved (Figure 14) 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 under the aegis of Clean Energy Program where AEPC succeeded in meeting the stated target of 15,000 households. Under "Solar pumping for agriculture", AEPC overachieved and succeeded to provide systems to 176% of the beneficiary. Similarly, installation of solar PV at public institutions stood at a whopping 168% %. Solar cooker & dryer and solar drinking water witnessed low progress of 39% and 30% respectively.

Figure 11: Solar PV Array and Powerhouse of 100kWp Gutu Solar Mini-grid (Chaukune, Surkhet)

Figure 12: Battery and Control Room of 30kWp Malladehi Dandapur Solar Mini-grid (Purchaudi, Baitadi)

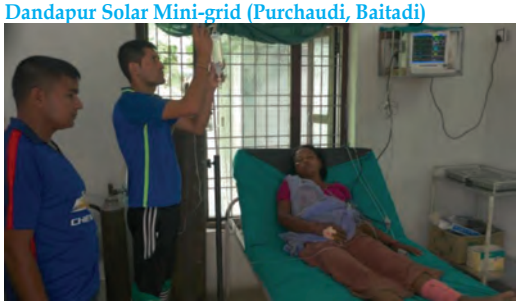


Figure 13: Snake bite treatment centre powered by solar energy

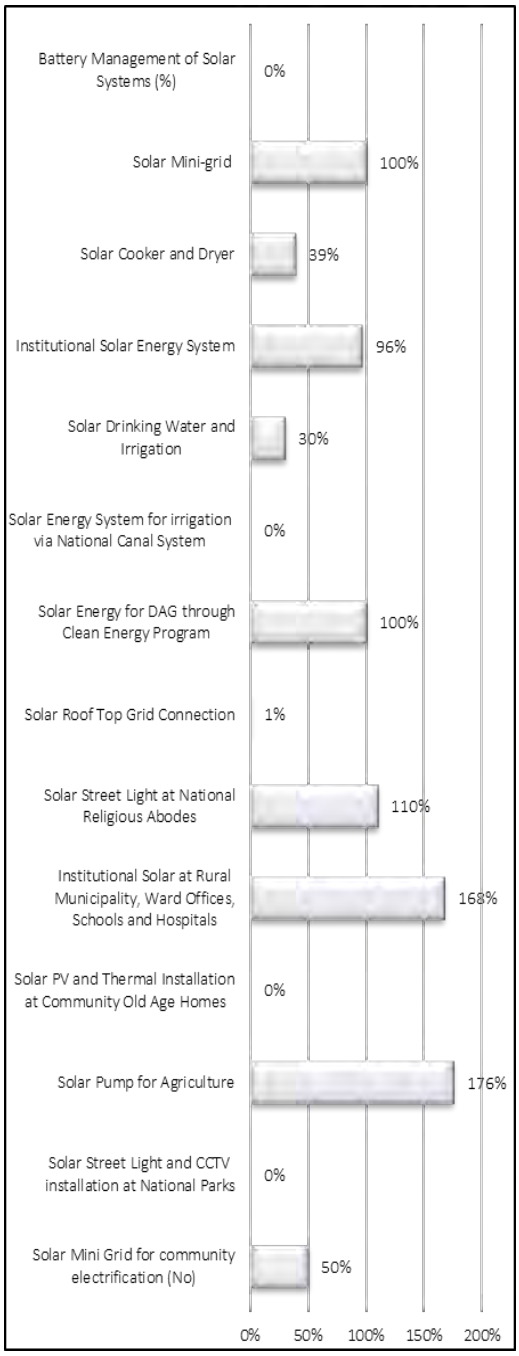


Figure 14: Progress of different activities under solar technology promotion

4.2.3 Biogas Promotion

In the review period, AEPC largely targeted to implement domestic biogas plants and a paradigm shift towards development of large biogas plants can be depicted observing number of feasibility studies of large biogas plants conducted during the year s. Dedicated programs targeted at Dalits, marginalized group and earthquake affected victims were planned as well. Most of the the activities planned under the domain of biogas went underachieved during the reporting period. Activity on the feasibility study of large biogas plant over achieved the target and the activity on biogas pipeline and bottling met the required target. Overall progress of the Biogas technology in the FY 2018/19 is depicted in figure 15.

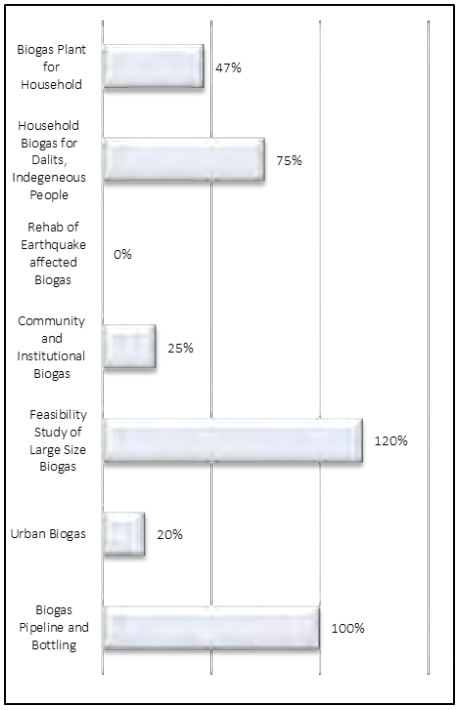


Figure 15: Progress of biogas technology

Of the targeted 20,000 domestic biogas plants 9451 (47%) was achieved. Additional, 5000 households of Dalits, indigenous people were targeted to reach with the domestic biogas technology and the progress stood at 75%,. Rehabilitation of earthquake

affected biogas remained unachieved. Low progress was seen on urban and biogas plants. Out of the total target of 100 urban biogas, 20 (20%) plants were installed.

Progress on feasibility study of large biogas plant marked to be the most successful activity planned for the biogas technology overachieving where feasibility of 60 (120%) large size biogas plants were completed against the target of 50 feasibility studies. Similarly, hundred percent was achieved on the development of a prototype project on pipeline and bottling plant of biogas generated through bio waste and sewage systems

Figure 16: Feeding cow dung in biogas digester

Figure 17: Hon'ble Minister Barsha Man Pun "Ananta" and GoN representatives observing the home biogas system at AEPC premises

Figure 18: Envipower Nepal Energy & Fertilizer company, Bhairahawa 3700 m3 biogas Plant for Bio-CNG Bottling and sale

4.2.4 Biomass Energy

Under the Biomass Energy portfolio, AEPC achieved a cumulative figure of more than 40,000 improved cook stoves dissemination. The overall progress of planned activities remained to be satisfactory. Targets related to ICS dissemination at households, smoke free house program, smoke free homes at 1500 metres for targeted groups were overachieved. Achievement stood at 299%, 107% and 118% respectively. Activities on up-gradation of rocket stove industries (60%) and improvement of briquette and pellets (5%) went underachieved Activities on identification of potential areas for gasifier systems, electrification through bio energy and study on alternatives on bio-fuel (Guitha Replacement) went unachieved at all. While activities on institutional gasifier and demand

based improved cook stoves (more than 3 tier) fully achieved its targets. Status of performance of different activities planned is presented in figure 19.

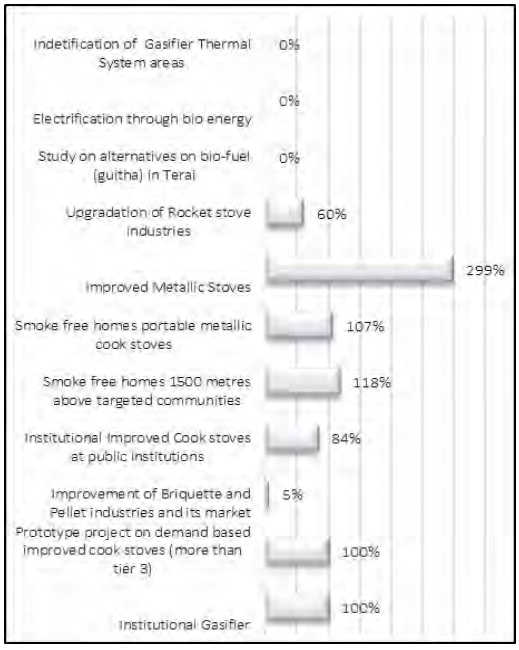


Figure 19: Progress of biomass related activities

4.2.5 Wind Energy

In the reporting period, target was set to 30 kW from wind/solar hybrid systems where the progress stood at 100%. Similarly, installation of one data logger and implementation of a resource mapping program were planned. All these activities were entirely achieved as targeted. Out of 12 detailed feasibility planned, 5 were conducted during the reporting period.

Figure 20: 15kWp Solar PV array and 20kWp Wind Turbine at Chisapani Village of Hariharpurgadi, Sindhuli

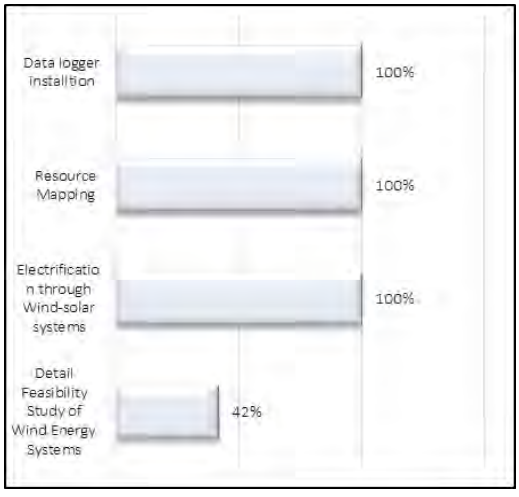


Figure 21: Progress under wind energy

4.2.6 Productive Energy Use activities

In the FY 2018/19, there were 4 dedicated activities planned for promotion of productive energy use. The activities included training on community level enterprise development, promotion of productive energy use and productive energy use activity for targeted group. Community level planning on entrepreneurship development and productive energy use for employment and commerce overachieved with a

massive 300% and 106% respectively. While, productive energy use activities achieved a satisfactory 86%, targeted group activity could only achieve 11%.

Figure 22: Galaxy computer educational institute powered by 29kW Simli MHP in west Rukum.

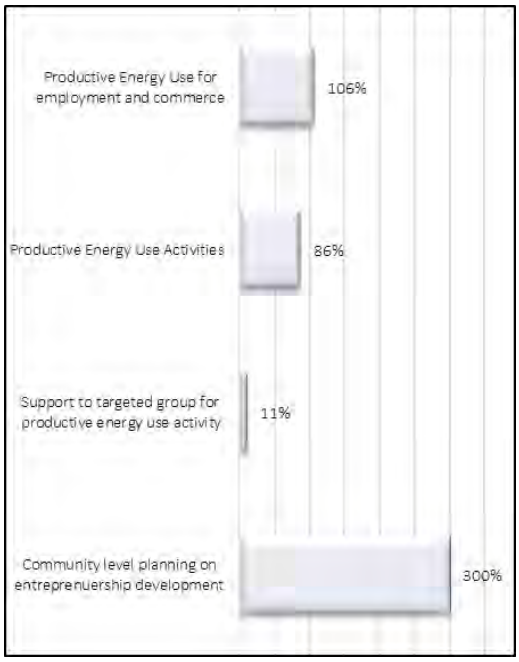
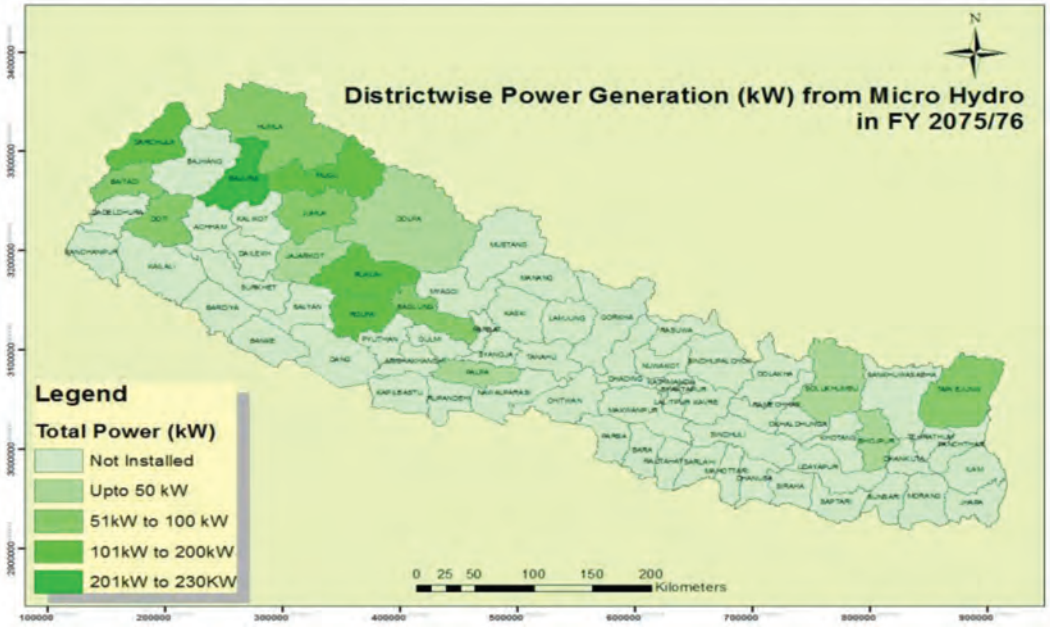
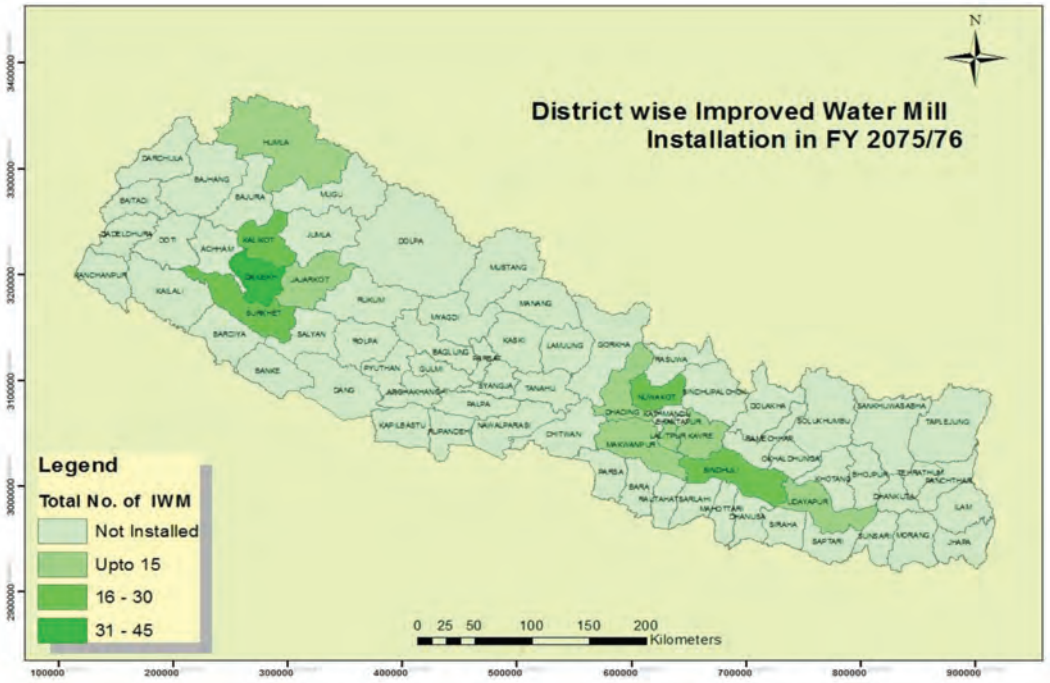
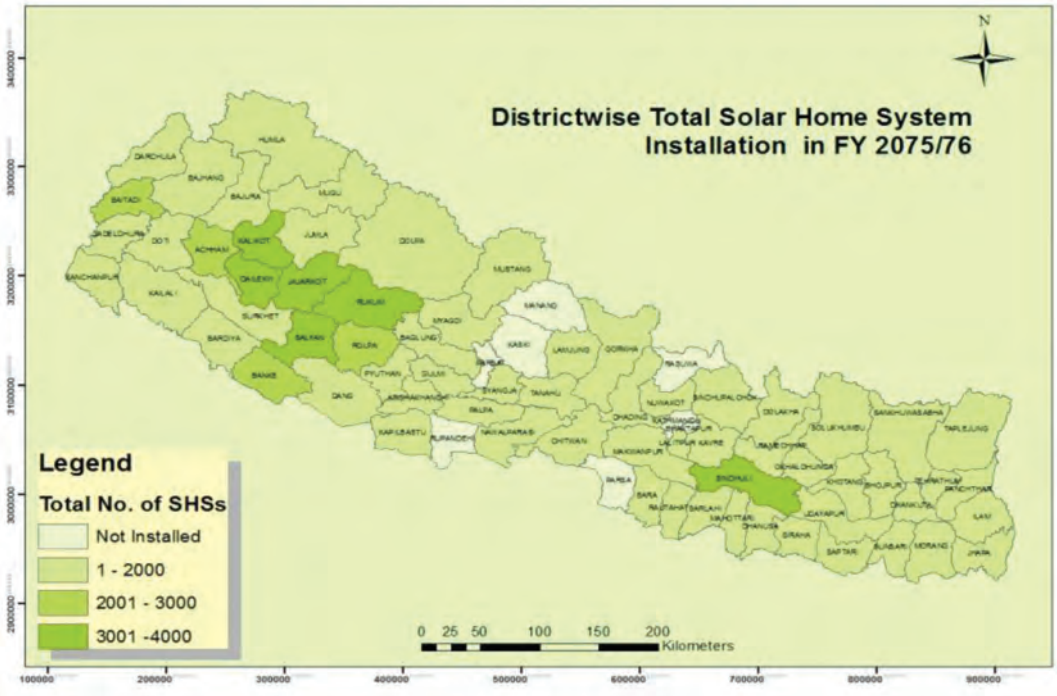


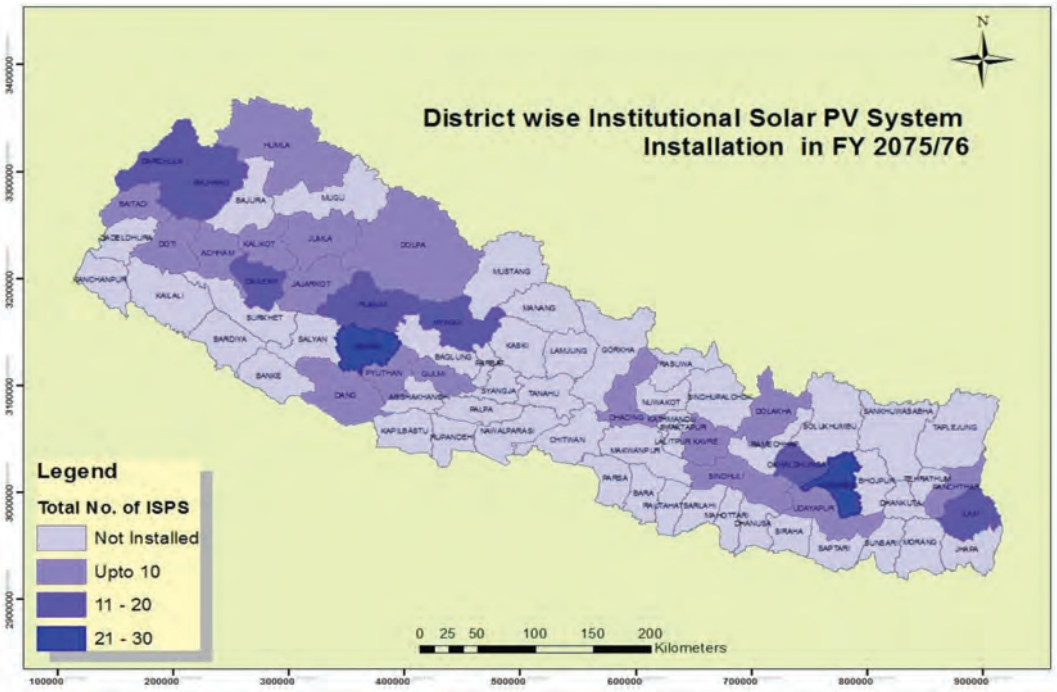
Figure 23: Progress of PEU activities

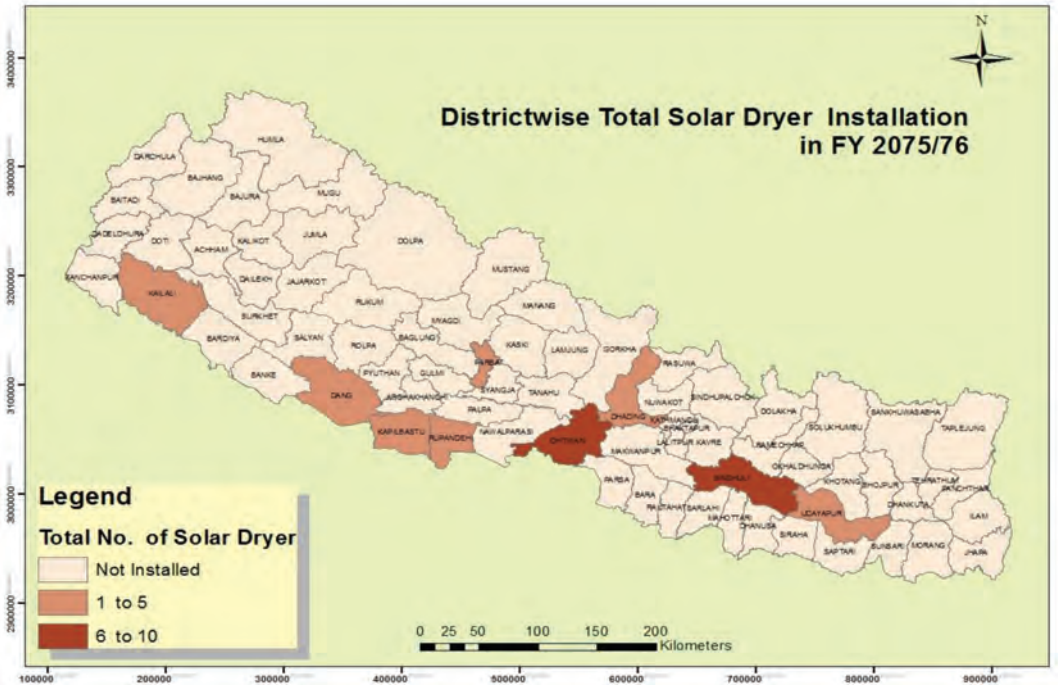
GIS MAPs OF RETS INSTALLED IN FY 2075/76

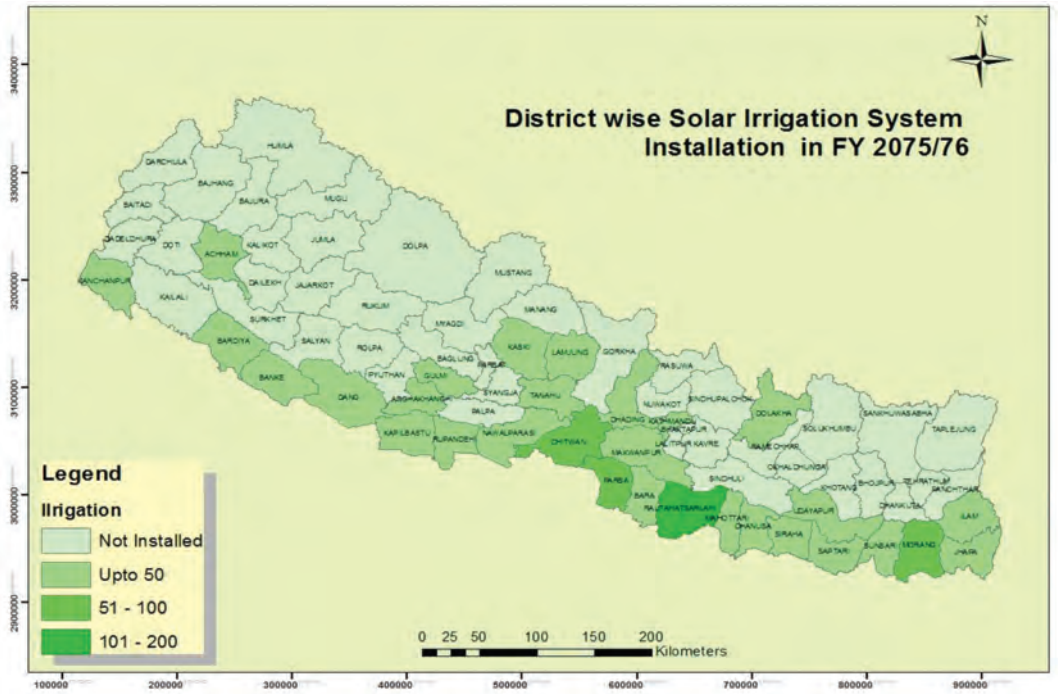


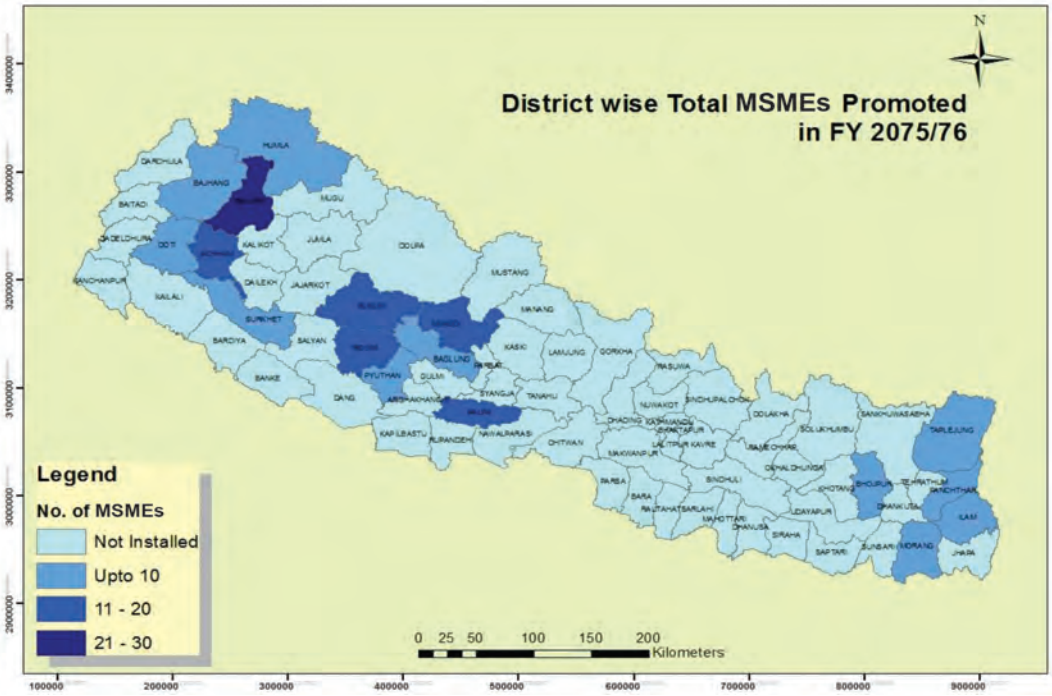


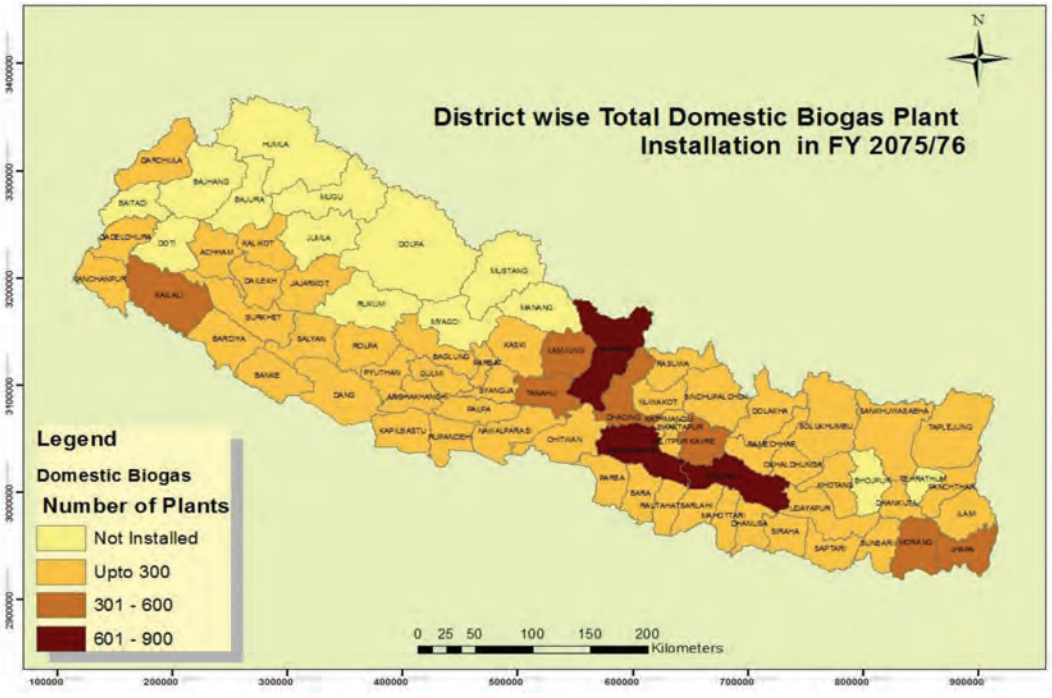

Districtwise Total Solar Home System
Installation in FY 2075/76
N
Legend
Total No. of SHSs
Not Installed
1 - 2000
2001 - 3000
3001 -4000
0 25 50 100 150 200
Kilometers

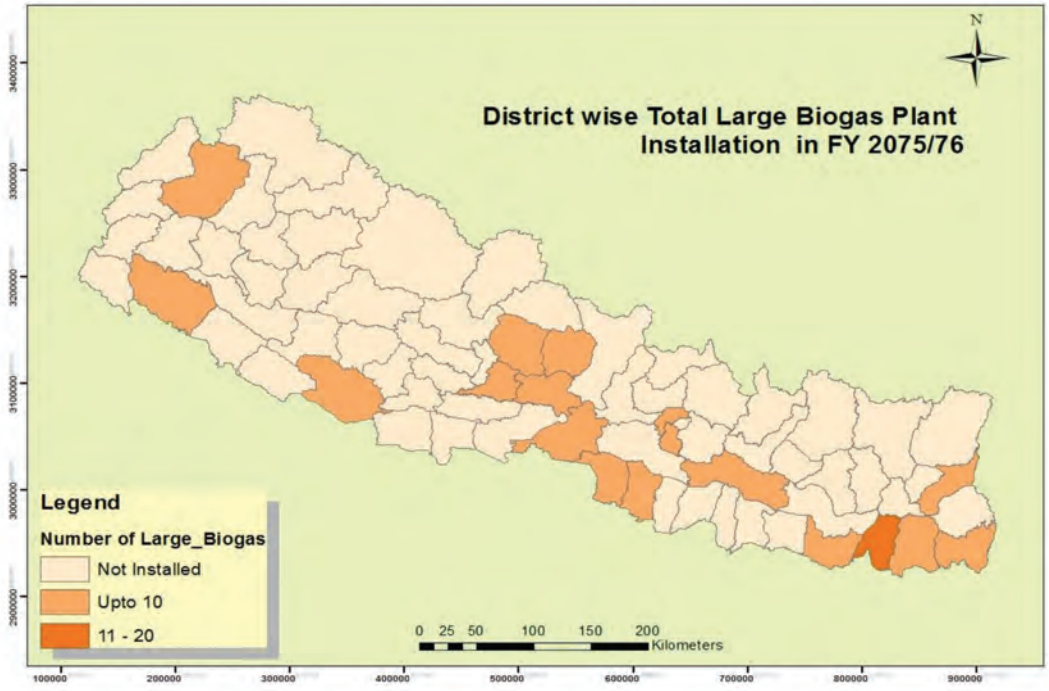

District wise Institutional Solar PV System
Installation in FY 2075/76
N
Legend
Total No. of ISPS
Not Installed
Upto 10
11 - 20
21 - 30
0 25 50 100 150 200
Kilometers

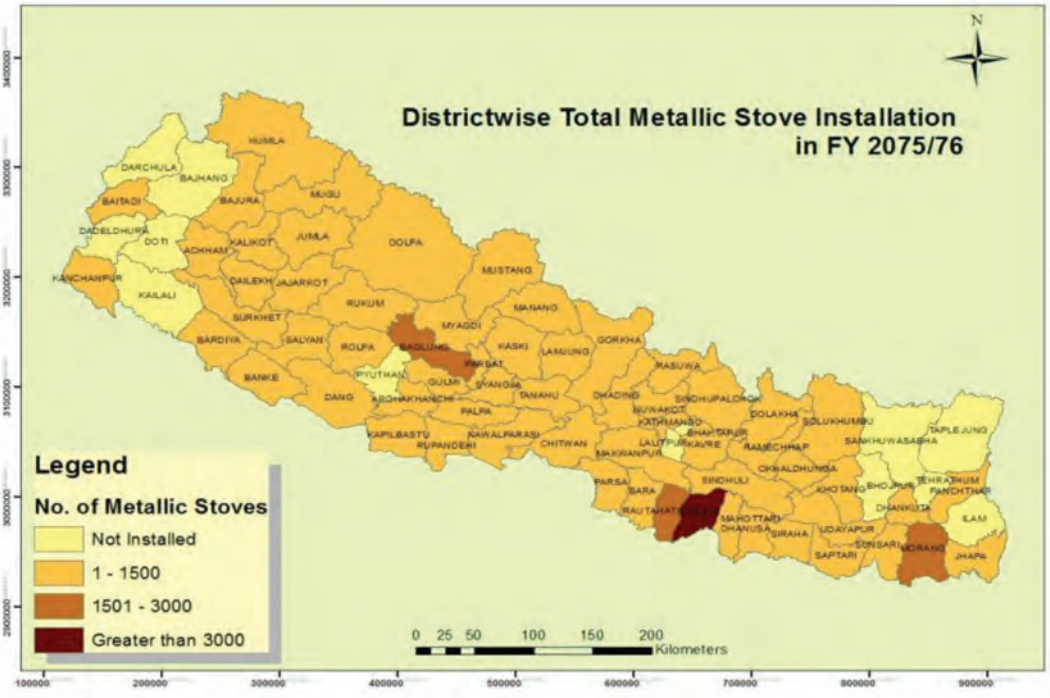

Districtwise Total Solar Dryer Installation
in FY 2075/76
N
Legend
Total No. of Solar Dryer
Not Installed
1 to 5
6 to 10
0 25 50 100 150 200
Kilometers

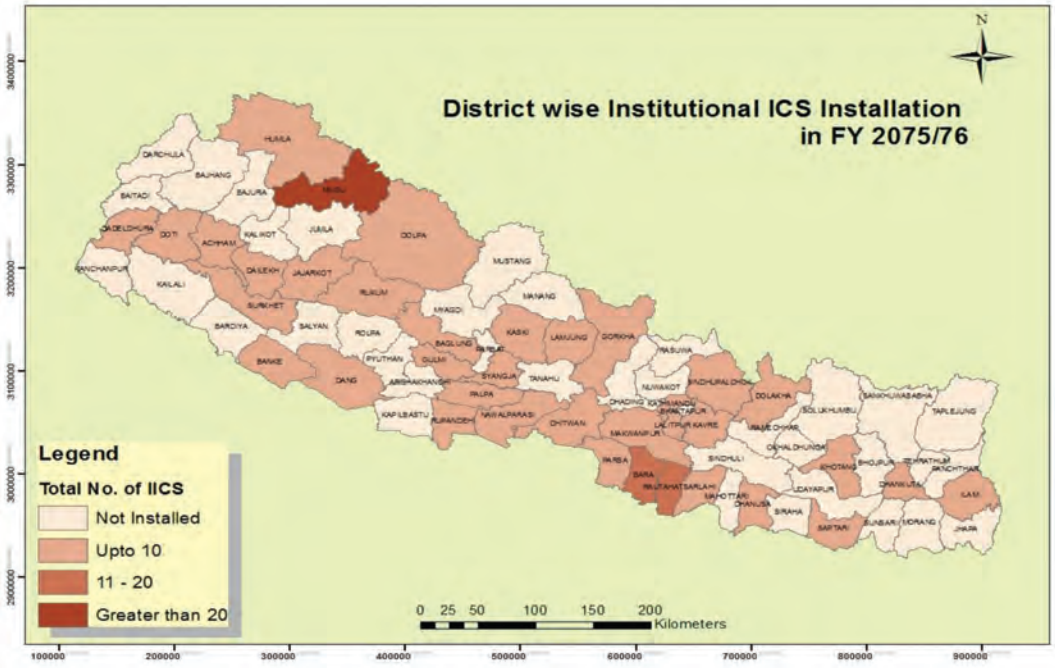

District wise Solar Irrigation System
Installation in FY 2075/76
N
Legend
Irrigation
Not Installed
Upto 50
51 - 100
101 - 200
0 25 50 100 150 200
Kilometers

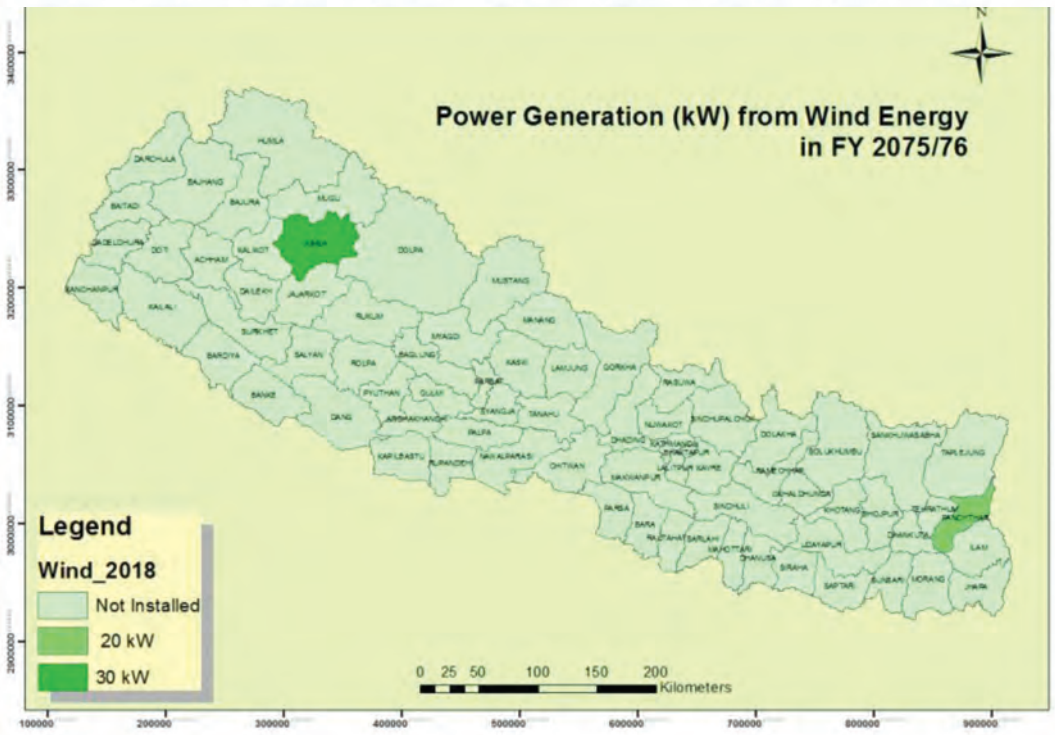

District wise Total MSMEs Promoted in FY 2075/76
N
Legend
No. of MSMEs
Not Installed
Upto 10
11 - 20
21 - 30
0 25 50 100 150 200
Kilometers


District wise Total Domestic Biogas Plant Installation in FY 2075/76
N
Legend
Domestic Biogas
Number of Plants
Not Installed
Upto 300
301 - 600
601 - 900
0 25 50 100 150 200
Kilometers


N
District wise Total Large Biogas Plant Installation in FY 2075/76
Legend
Number of Large_Biogas
Not Installed
Upto 10
11 - 20
0 25 50 100 150 200
Kilometers


N
Districtwise Total Metallic Stove Installation in FY 2075/76
Legend
No. of Metallic Stoves
Not Installed
1 - 1500
1501 - 3000
Greater than 3000
0 25 50 100 150 200
Kilometers


District wise Institutional ICS Installation
in FY 2075/76
N
Legend
Total No. of IICS
Not Installed
Upto 10
11 - 20
Greater than 20
0 25 50 100 150 200
Kilometers


Power Generation (kW) from Wind Energy
in FY 2075/76
N
Legend
Wind_2018
Not Installed
20 kW
30 kW
0 25 50 100 150 200
Kilometers


SUSTAINABILITY FRAMEWORK

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, accessing international climate finance and other climate change adaptation activities in AEPC.

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 22nd GCF Board on November, 2018 has approved the accreditation. This allows AEPC to directly access the projects having low to medium environmental risks with GCF worth USD 50 Million. The accreditation to the GCF has brought the following opportunity for AEPC as well as for the 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).

Major achievement is seen in the Green Climate Fund with the accreditation of AEPC as the DAE. For this purpose, AEPC has developed Entity Work Programme (EWP) that constitutes of the potential project pipelines. Furthermore, four concept notes for different projects on (i) Clean Cooking Solutions based on electric cooking, biogas and improved cook stoves, (ii) Equitable Access to Green Agriculture based on solar irrigation, (iii) Energy access in health and education based on solar energy and (iv) Large Size biogas program have been prepared. The first two concept notes have been processed for the NDA's approval.

Similarly, a project outline for "clean cooking solution for all" focusing on tier-3 clean cooking solutions in province 5 has been shortlisted by the NAMA Facility.

5.1.1 Carbon Projects

AEPC holds eight Clean Development Mechanism (CDM) projects and program of activities (PoA) which contributes as its regular source of revenue. Till date, about 2.9 Million Certified Emission Reduction has been sold equivalent to the 14.42 Million USD from household Biogas and Micro-hydro projects.

In terms of issuance of the certified emission reductions (CERs), the reporting period stood as one of the successful year in the history with issuance of more than 0.6 million CERs.

In the reporting period, Biogas Project activities and PoA generated 0.57 Million CER whereas the micro-hydro project generated 24,611 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 successful in this reporting period. The total amount generated from carbon selling in this reporting period is about 2.9 Million USD. The program of activities design document (PoADD) for the large size biogas carbon project was completed and the registration process is underway.

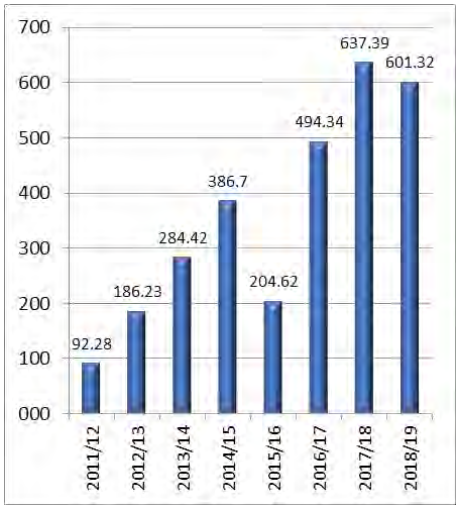


Figure 24: Year wise issuance of CERs (in '000)

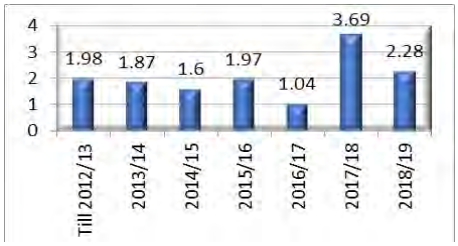


Figure 25: Year wise carbon revenue earning (in M USD)

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). Similarly, the first verification of the Improved Water Mills PoA was also initiated which is expected to generate about 18,895 CERs. Under Biogas PoA, 1 Component Program Activity (CPA) was included during the reporting period. Additionally, a large size biogas as a new PoA is devveloped and validation was inititated in the reporting period.

5.2 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 drafted in the previous reporting period has been approved by the AEPC board which has strengthened GESI related activities

5.3 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 acts 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.

5.4 COMPLIANCE RELATED ACTIVITIES

To strengthen the internal control, internal audit and the compliance related issues, the compliance unit in has been working effectively since the previous two years. In the second year, compliance unit initiated important tasks during the reporting period. Compliance unit conducted physical verification of various renewable energy technologies, performed IT audit of existing systems and websites, reviewed the grievance handling mechanism, produced annual and trimester compliance reports. Based on those reports, compliance unit will recommend AEPC management to improve the internal control, ethics, internal audit and compliance function of AEPC.

5.5 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 external firms termed as third party monitors based on the subsidy delivery mechanism. Training for power output and household verification inspector and orientation training programme for third party monitoring consultants were conducted by MQA unit.

5.6 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 programmes /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 Sudoorpaschim

Province have been established. The reporting period witnessed the signing of MoUs with Ministry of Physical Infrastructure Development (MoPID) at all the 7 provinces, with 14 local governments of Province 1 and Sudoorpaschim Province, with the National Association of Rural Municipality in Nepal (NARMiN) and Municipal Association of Nepal (MuAN). Further, Outreach conducted 24 capacity development activities on RE at provincial and local level out of 54 planned. Activities on orientation of RE at provincial and local level reached 18 out of 24 and support in capacity development of stakeholders on planning, implementation and monitoring related to Renewable Energy reached 7 out of 21 planned.

5.7 TRAINING AND CAPACITY BUILDING

AEPC continued with the capacity development activities of its partner organizations and other sectoral actors during the reporting period. In the reporting period potential large biogas developers and short listed biogas companies received significant attention through their participation in the workshops and trainings Micro hydro operator and members of micro-hydro cooperatives received trainings on management and financial literacy and microfinance operations. Further trainings were conducted to solar mini grid engineers, house wiring and electric safety training to local technicians. 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. Training on International Finance Corporation's (IFC) Performance Standards, workshop on IFC sustainability framework and Capacity development programme on Gender based violence were conducted among others for AEPC staffs. Details of the training programs conducted is provided in Annex 5.

5.8 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 evaluation report was prepared that covers the five years from FY 2012/13. Similarly, the audit of Central Renewable Energy Fund (CREF) was completed along with Information Security Audit of AEPC IT Systems, Subsidy Application Management System (SAMS) and Official Website., AEPC also commissioned an independent consultant to conduct Annual Environmental and Social Safeguard Review of AEPC and Annual Review on Quality Assessment of Overall Effectiveness of Internal Audit / Control Function and Compliance Unit.

Upon the request of Department of Electricity Development (DoED) AEPC drafted "Guidelines for development of Utility Scale Solar PV Project" in collaboration with MoEWRI, DOED, NEA in 2017 for systematic development of the sector

which was finalized through wide stakeholder consultation, including the private sector. Further, a one-day workshop was organized in August 2018 for government and private sector engineers to orient them on different aspects of utility scale solar PV projects development and experiences of India. The guidelines were approved by MOEWRI in June 2019.

5.9 EMERGENCY RELIEFS

Bara and Parsa Districts of Province 2 were hit hardly by the first ever recorded tornado in Nepal The tornado destroyed more than 1000 homes with the official death toll reaching 27 and affecting more than 3000 families. The majority of the damage took place in Bara. Peoples affected by the Tornado in Bara were supported with 950 Small Solar Home Systems and 1000 Improved Cook Stoves as the Emergency Response for lighting and cooking solution.

Figure 26: Handover of improved cook stoves for the tornado affected people

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 a clean electricity solutions. This has reached to the 18% of the total population and has created 30,000 jobs in this sector.

In this reporting period generation of 1,453 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 157 kW, access to electricity has been reinstated. More than 75,000 household benefitted from the electricity generation through solar home system. Similarly, solar mini-grid installation, supported to light around -275 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 whereas complements to achieve other goals as well.

Figure 27: 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 86,803 tCO_2eq. The detail technology wise emission reduction achieved is given in figure 28.

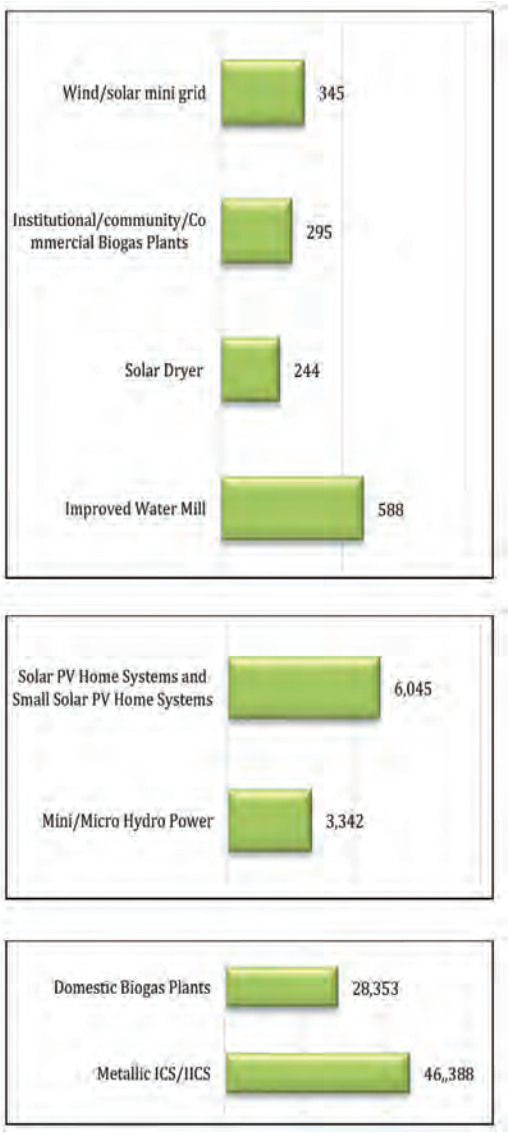


Figure 28: Emission Reduction Achieved by RETs installed during reporting period

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

Community Electrification through Solar Mini-grid Project

"In past there was no electricity access in Gutu village so I was facing difficulty to continue and expand my tailoring business but after having reliable electricity service through solar mini-grid at present, I am able to expand my business," said Ms. Parbati Sapkota, resident of Gutu Bazaar. The daily life of local women and children has transformed with the availability of 24/7 uninterruptible electricity service from solar mini-grid system that is connected to 344 households of Gutu supplying 3-phase 400Vac and 1-phase 230Vac electrical power.

With the financial and technical support from Asian Development Bank (ADB) through SASEC Project, AEPC has implemented 100kWp solar mini-grid system at Gutu village of Chaukune Rural Municipality-8, Surkhet District. The total project cost is NPR. 56.59 million. This has enabled Gutu village to be energy independent sourcing locally available abundant solar energy.

Some of the advanced features introduced in Gutu solar mini-grid system are; (i) 100kWp solar photovoltaic system can be connected to the national grid line in future, (ii) the technical parameters of mini-grid system can be monitored sitting at any part of the world via internet and (iii) the pre-paid energy meters ensure electricity tariff collection in advance.

The dream of local people came true after having modern electricity service through solar mini-grid system at Gutu village which has changed life of 344 household beneficiaries. In addition more than dozen business enterprises and shops have expanded their business after having relaible electricity supply. The end users are operating lights, fans, televisions, mobile charging, refrigerators, computers, motors, pumps and many more electrical appliances through Gutu solar mini-grid service. The mini grid has been providing 24/7 electricity to health post, schools, banks, police station and other institutions raising living standards of the locals. The solar mini-grid is owned and operated by local community, which is now registered as Cooperative in order to do energy service business in their village.

Community Private Partnership (CPP) Model Leads to Sustainable Operation of MHP

In 2018, the 29 kW Simli MHP, West Rukum, Karnali Province was leased out to Mr. Moti Ram Roka, a local entrepreneur, for day to day operation and management for an annual fee of NRs. 84,000. The community decided to lease out their plant as it was generating only about NRs. 20,000 a month which was hardly enough to meet the operating costs. After taking over the management of the plant, Mr. Roka focused on increasing the number of productive use enterprises to maximize revenue. As of December 2018, Simli MHP is powering more than 40 enterprises, of which only 12 received government subsidy and the rest were established by entrepreneurs themselves. The enterprises thus established include eateries, lodges, tailoring shops, jewelry stores, beauty parlor, among others. In addition, there is 1 offset press, an automobile repair workshop and a health post powered by the MHP. Moreover, 60 different enterprises are also benefiting from better lighting in Simli Bazar. Out of 102 enterprises recorded in December 2018, 24 are owned by women and 78 by men. Altogether, these enterprises employ 96 men and 49 women

The credit for the sharp increase in number of enterprises goes to reliable electricity supply, as Mr. Roka is fully aware that his income is directly tied up with reliable supply. Mr. Roka makes NPR. 75,000 from electricity sales and gives NPR. 7,000 to the community as per the lease agreement. He further informed that a couple of other MHPs have also shown interest in this "community owned and privately managed model".

Bioenergy giving energy to life

Anyone meeting Beludevi Rokaya of Kotbhairav, Bajhang for the first time would not believe that she is a centenarian. At home, she still prepares both the morning and evening meals. Even the snacks for workers at her farm are prepared by her. Some of the credit of her vitality goes to the biogas plant installed at her home.

She remembers the days when cooking a meal was an arduous task, Collecting firewoods from the local forest, smoke emission and the impacts it had on her health was menacing. After his son Janak Bahadur Rokaya, a teacher at the local Nawaratna Primary School installed a 6 cubic metre biogas plant in the home, mom Beludevi has new found energy to cook. "Cooking on biogas in easy and quick. There is no smoke and even the utensils never black" Beludevi says pointing at her biogas stove.

Others at Kotbhairav have also started to install biogas at their homes, Dal Bahadur Rokaya, a local avows that waste from biogas is an excellent organic fertilizer for crops, which has supported him in his commercial farming endeavor. Biogas plants have ensured timely and hassle free food preparation, more time for additional chores and even income generation, good hygiene with the smoke free environment and construction of toilets. These biogas plants once installed can last up to 30 years and can save up to 5-10 kgs of firewood per day.

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 for cooking which is a huge sectoral challenge.

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. Awareness on energy and financing options are still not widespread enough, and limited organised effort is being made for demand creation. Significant economic barriers persist, and the transition to a market-enabled or credit-based model has been slow. Furthermore, the renewable energy (RE) market is not significantly benefitting from innovative approaches, best available technologies (BATs), and global best practices

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 renewable energy 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 building and land 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.

- Implementing the working modalities 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
- Scaling-up activities in energy efficiency. Maintaining quality standards of RETs and adopting new technologies
- Adhering new policies and regulations for system improvements
- Operationalizing the RE Sector MIS system at the federal, provincial and local levels.
- Enhancing capacity and establishing

facilities for an effective Battery Management System.

- Re-engineering AEPC and its functions in new federal context
- Transforming towards Center 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. Furthermore, AEPC is aiming at developing a RE MIS system superseding all existing systems will incorporate the provincial and local levels and ultimately supersede
- 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, Sustainable Energy for ALL 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, Climate Investment Fund (CIF), and NAMA Facility 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.
- Energy Efficiency, the new mandate given opens new avenues for AEPC.
- Large Scale Biogas Plants and Waste to Energy Projects are the current demand where AEPC's experience can be of huge advantage.
- Utility Scale Grid Connected Solar System has huge potential in

decreasing the ever dependency in imported energy.

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

- Establish a strong linkage with the provincial and local level government to support initiatives in the RE sector. AEPC supporting overall RE development as the "Centre of Excellence" in the changed context.
- 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.
- 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, utility scale solar PV and grid connection of MHPs.
- Accessing international climate finance with timely development of project concepts and pipelines. And 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 renewable.
- Engaging private sectors as investors/ partners rather than contractors and promote RE based entrepreneurship.
- Special focus for reaching to last mile people.
- Integrated Renewable Energy database and information exchange system within three governments. A hub for national and international knowledge management.
- Aligning DPs support through National Renewable Energy Framework.
- Lead to a rapid paradigm shift in the areas of municipal waste to energy projects and Large scale biogas plant , bottling and pipelines for an overall up-scaling of the RE sector in terms of capacity, investment, size and innovation.
- Implement the challenge fund to ensure an inclusive and wider participation and galvanise innovation.
- Institutional strengthening through enactment of its own act and strengthening coordination between RE sector and other sectors such as agriculture, forestry, health, education and urban development.

ANNEXES

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

SN	Activity/Program	Unit	2018/19		
			Target	Achievement	% Achievement
1	Data logger installation for mapping wind energy feasibility	No.	1	1	100
2	Wind Solar Hybrid system for electrification	kW	30	30	100
3	Workshops and Seminar on RETs	No.	5	5	100
4	Publication and dissemination of different materials on RETs	No.	50	50	
5	Awareness Programme on Renewable Energy	No.	10	10	100
6	Capacity development of local and provincial level on renewable energy	No.	56	24	42.85
7	Wind and solar energy resource mapping	No.	1	1	100
8	Prototype project on pipeline and bottling plant of biogas generated through bio waste and sewage systems.	No.	1	1	100
9	Prototype projects on installation of bioenergy based institutional gasifier	No.	35	35	100
10	Operation of prototype projects for market promotion of demand based improved cook-stoves (Tier 3 above)	No.	250	250	100
11	Up-scaling of enterprises manufacturing rocket cook-stoves	No.	5	3	60
12	Study on alternatives of bio-briquettes (Guitha) used in terai region.	No.	1	0	-
13	Detail feasibility studies on irrigation projects using pumping technology through mini and micro hydro projects	No.	10	10	100
14.	Development of plans for commercialization of community projects	No.	10	30	300
15.	Orientations at provincial and local levels on renewable energy	No.	21	18	85.71
16.	Support in the establishment and operation on renewable energy offices at provincial levels	No.	7	7	100
17.	Development of strategies and capacity development promotion, planning, development, implementation and monitoring of renewable energy technologies for officials and entities affiliated to government and non-government offices at the provincial and local level	No.	21	7	33.33
18	Implementation of renewable energy related activities in coordination with rural municipal and municipal federations.	No.	2	2	100

SN	Activity/Program	Unit	2018/19		
			Target	Achievement	% Achievement
19	Support in the development of provincial and local level energy plans	No	50	0	-
20.	Development of support packages at provincial and local levels for implementation of renewable energy programs and projects	No.	7	2	28.57
21	Development of Act, regulation and working procedure on Renewable energy	No.	5	5	100
22	Detail Feasibility Study of Wind Energy Project	No.	12	5	41.66
23	Piloting of Urban Biogas Plant installation	No.	100	20	20
24	Feasibility Study of Large Biogas Plants	No.	50	60	120
25	Up-gradation of industries and market of briquette and pellets	No.	100	5	5
26	Feasibility studies on bio energy electrification	No.	4	0	-
27	Detail feasibility studies of micro and mini hydro projects	No.	15	35	233.33
28	Transformation of micro hydros into mini grid and connecting to the national grid	No.	5	2	40
29	Identification of potential areas and feasibility studies on installation of bio energy based gasifier thermal systems	No.	5	0	-
30	Installation of solar mini grid for community electrification	No.	2	1	50
31	Piloting of solar pumping on national canal system	No.	1	0	-
32	Installation of solar street lights and cctv camera in the highways of national parks	No.	2	0	-
33	Installation of solar P.V. and thermal at community old age homes	No.	60	0	-
34	Subsidy on connection of existing roof top solar to the national grid	No.	1000	5	0.5
35	Smoke free homes program: installation of two/ three pot holes improved cooking stoves for dalits, indigenous, backward classes and poor residing above 1500 metres from sea level.	No.	2000	2352	117.6
36	Installation of household biogas plants for target groups comprising of dalits, endangered, indigenous and tribal communities	No.	5000	3768	75.36
37	Installation of solar pumping system for irrigation (cash crop promotion for target groups including dalits, endangered, indigenous and tribal communities)	No.	500	878	175.6
38	Installation of institutional solar energy technologies at rural municipal offices, ward offices, community schools and health posts	No.	280	470	167.8
39	Installation of solar lightings at national religious abodes (dham)	No.	20	22	110

SN	Activity/Program	Unit	2018/19		
			Target	Achievement	% Achievement
40	Clean Energy Program: Installation of solar energy systems for target groups including dalits, tribal and indigenous	No.	15000	15000	100
41	Smoke free homes programme: Distribution of portable metallic cookstoves to households belonging target groups including dalits, tribal and backward classes.	No.	10000	10750	107.5
42	Installation of institutional improved cook stoves at religious institutions, tourist attractions, old ages homes, orphanages, community schools, hospitals, health post and public entities	No.	250	209	83.6
43	Additional subsidy for incomplete sick micro hydro projects	No	20	15	75
44	Productive energy use for small and cottage industries operated by target groups including dalits, tribal and indigenous groups.	No.	26	3	11.53
	Total physical progress				113%

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

SN	Activity/Program	Unit	2018/19		
			Target	Achievement	% Achievement
1	Mini/Micro hydro installation	kW	3000	1453	48.43
2	Installation of Improved Water Mills	No	200	161	80.5
3	Solar Home System Installation	No	40000	60454	151.13
4	Solar water Pumping for Irrigation and Drinking water	No	100	30	30
5	Institutional Solar Photovoltaic System	No	250	241	96.4
6	Metallic Improved Cookstove Installation	No.	10000	29913	299.13
7	Household Biogas Installation	No.	20000	9451	65.11
8	Community and Institutional Biogas Plant Installation	No.	100	25	46
9	Productive Energy use Promotion	No.	150	160	106.66
10	Solar dryer and solar cooker installation	No.	100	39	39
11	Solar Mini grid installation	kW	275	275	100
12	Urban and commercial biogas plant installation	No.	150	33	22
13.	Rehabilitation activity for earthquake affected MHPs	kW	2000	157	7.85
14	Rehabilitation of earthquake affected biogas plants	No.	2500	0	-
15	Credit Mobilization through Central Renewable Energy Fund	%	28	28	100
16	Capacity development of CREF	%	28	18	64.28
17	Studies, trainings and capacity development related to community electrification	%	18.52	13.5	72.89
18	Studies, trainings, capacity development and quality control related to solar energy systems	%	18.52	6	32.39

SN	Activity/Program	Unit	2018/19		
			Target	Achievement	% Achievement
19	Studies, trainings, capacity development and quality control related to bioenergy systems	%	18.52	8	43.19
20	Studies, trainings, capacity development and quality control related to bio gas	%	18.52	16.5	89.09
21	Activities related to Gender and Social Inclusion	%	18.52	7	37.79
22	Carbon and climate change activities	%	18.52	18	97.19
23	Activities for accreditation as direct access entity of the green climate fund	%	18.52	15	80.99
24	Productive Energy Use	%	18.52	16	86.39
25	South Asia Sub-Regional Economic Cooperation (SASEC)	%	20	19	95
26	Management and Evaluation of National Rural Renewable Energy Programme	%	18.52	14	75.59
27	Capacity development of various stakeholder institutions; renewable energy policies ,plans and program implementation; program implementation and monitoring activities and technical assistance in expanding AEPC in the federal structure	%	18.52	8	43.19
28	Battery Management of batteries used for solar PV systems	%	20	0	-
	Total physical progress				66%

Annex-3: District Wise Installation of RETs in 2018/19

S.N	District	Biogas (Nos)		Solar (Nos)				Improved Cookstove (Nos)		IWM (No.)	MHP (kW)	Wind (kW)	MSME (No.)
		Domestic	Large	SHS & SSHS	ISPS	Irrigation	Dryer	Metallic	IICS				
1	Achham	1		2588	10	2		109	8				15
2	Arghakhanchi	5		119		2		68					
3	Baglung	5		13				1717	1		100		4
4	Baitadi			2245	10			807			97		
5	Bajhang			991	14								4
6	Bajura			280				113			230		30
7	Banke	113		2915		6		1	1				
8	Bara	215	2	1614		38		19	14				
9	Bardiya	233		401		15		3					
10	Bhaktapur	10											
11	Bhojpur			650							40		8
12	Chitwan	72	1	276		76	10	88	7				
13	Dadeldhura	15		454					1				
14	Dailekh	77		3919	19			75		43			
15	Dang	121	3	1124	2	1	1	8					
16	Darchula	32		1060	12						200		
17	Dhading	455		253	2	18	3	24	1	9			
18	Dhankuta	23		72				2	3				
19	Dhanusa	44		2		14		18	1				
20	Dolakha	73		361	6	6		969	6				
21	Dolpa			381	10			677	2		50		
22	Doti			735	2				8		90		4

23	Gorkha	671		52				1228	1				
24	Gulmi	3		188	2	9		1033	1				
25	Humla			87	2			584	6	7	60		1
26	Ilam	175	1	29	12	1			9				1
27	Jajarkot	8		3455	6			181	4	2	48		
28	Jhapa	546	6	7		18		2					
29	Jumla			744	8			75			55	30	
30	Kailali	461	1	1868			3						
31	Kalikot	16		3562	10			36		23			
32	Kanchanpur	272		18		10		1					
33	Kapilbastu	48		1		40	1	1					
34	Kaski	223	1					442	2				
35	Kathmandu	44	10					2	3				
36	Kavrepalanchowk	418		590	2			540	2	10			
37	Khotang	1		1095	23			1	2				
38	Lalitpur	45	1	18					3	3			
39	Lamjung	426	5	33		1		309	5				
40	Mahottari	41		19		6		26					
41	Makawanpur	890		1086		1		153	3	13			
42	Manang							23					
43	Morang	340	3	44		63		2250					1
44	Mugu			637				271	63		104		
45	Mustang			1				1					
46	Myagdi			86	12			55					18
47	Nawalparasi	58		1162		43		416	4				
48	Nuwakot	273		101				127		17			
49	Okhaldhunga	238		1570	16			630					

50	Palpa	82		558				10	6		26		19
51	Panchthar	5	3	584	4			1				20	7
52	Parbat	9					3	8					
53	Parsa	39	3			79		2	1				
54	Pyuthan	3		830	8								4
55	Ramechhap	288		1618				446					
56	Rasuwa	18						42					
57	Rautahat	132		495		198		2202	12				
58	Rolpa	37		2721	27			187			129		13
59	Rukum			3140	14			240	2		132		14
60	Rupandehi	35				11	5	38	4				
61	Salyan	21		3001				18					
62	Sankhuwasabha	1		811									
63	Saptari	110	1	383		44		692	6				
64	Sarlahi	150		147		119		10694	4				
65	Sindhuli	748	1	3734	4		8	453		16			
66	Sindhupalchowk	130		51				241	1				
67	Siraha	40		520		19		28					
68	Solukhumbu	6		631				209			30		
69	Sunsari	81	13	350		32		261					
70	Surkhet	289		1899				17	10	16			8
71	Syangja	157	1	13				83	2				
72	Tanahu	308	2	278		1		729					
73	Taplejung	3		229							62		9
74	Terhathum			311									
75	Udayapur	68		1244	4	5	5	227		2			

Annex-4: Major Deviation of Key Activities

4.1 Targeted RE program (GoN Financed)

Major deviations of key activities	Reasons for deviations
Detail Feasibility Study of Wind Energy Project	Due to the delay in the revision of the budget, seven out of twelve planned detail feasibility could not be conducted
Piloting of Urban Biogas Plant installation	This was pilot project for the urban area and demand could not be garnered.
Up-gradation of industries and market of briquette and pellets	As very less amount of demand were received, the activity could not meet the desired target.
Feasibility studies on bioenergy electrification	Suitable projects sites could not be identified, hence it was not able to move forward.
Transformation of micro hydros into mini grid and connecting to the national grid	Due to the delay in power purchasing agreements between developers and NEA, the micro hydro could not be connected to the national grid.
Installation of solar mini grid for community electrification	Due to the delay in the revision of the budget, one out of two planned projects could not be conducted
Piloting of solar pumping on national canal system	Due to the lack of coordination with community and relevant stakeholders, the national canal project could not meet its targets.
Installation of solar P.V. and thermal at community old age homes	This was implemented on demand driven approach. AEPC called for the demand collection but demands could not be received at all.
Interconnection of existing roof top solar to the national grid	Lack of a guideline for interconnection of household roof top solar to national grid resulted that none of the households could be connected. Hence only five large businesses could be fulfilled.
Installation of household biogas plants for target groups comprising of dalits, endangered, indigenous and tribal communities	The budget received was enough to meet only 75% of the target.
Additional subsidy for incomplete sick micro hydro projects	This was implemented on demand driven approach. AEPC called for the demand collection but appropriate demands could not be received.
Productive energy use for small and cottage industries operated by target groups including dalits, tribal and indigenous groups	Due to the low demand from the targeted groups, the annual target could not be met.

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.
Household Biogas Installation	This programme was implemented 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 implemented 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 dryer and solar cooker installation	This programme was implemented 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.
Urban and commercial biogas plant installation	This programme was implemented 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.
Rehabilitation activity for earthquake affected MHPs	Due to insufficient budget, all of the target could not be met
Rehabilitation of earthquake affected biogas plants	Technical problem during tendering process and decision delayed

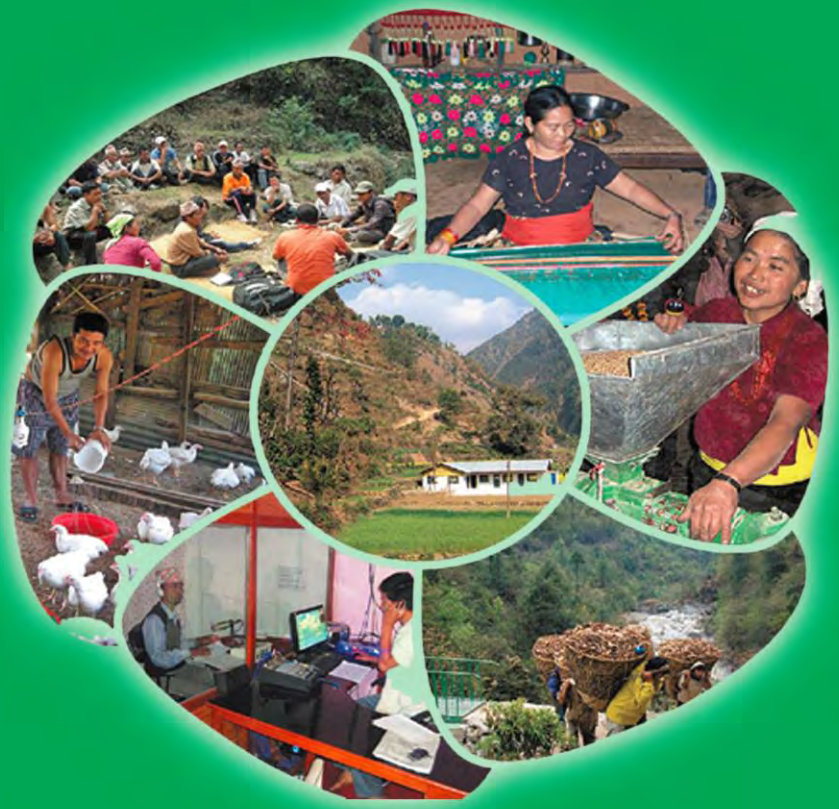
Annex-5: Training/Capacity Building Activities by AEPC

SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
	Large biogas promotional workshop-8 event	Biogas	1 day	Potential developer	354
	Biogas Mason (Level-1) Training	Biogas	8 days	Shortlisted biogas companies	25
	Biogas Mason (Level-1) Training	RERA/AEPC	8 days	Shortlisted biogas companies	25
	Biogas Supervisor (Level-2) Training	Biogas	6 days	Shortlisted biogas companies	25
	Onrintation to Biogas Construction companies	Biogas	1 day	Shortlisted biogas companies	100
	Train to Large Biogas Construction Companies to Familiarize with New Technologies Like CSTR/ MIBR/FD and UBS Systems	Biogas	7 days	Shortlisted biogas companies	20
	Train to Large Biogas Consulting Companies to Familiarize with New Technologies Like CSTR/ MIBR/FD and UBS Systems	Biogas	3 days	Shortlisted biogas companies	25
	Training Program on International Finance Corporation Performance Standards (IFC PS)	ESS Unit	2	AEPC Staffs	59
	Workshop on International Finance Corporation (IFC) Sustainability Framework and IFC Performance Standards (PSs)	ESS Unit	2	AEPC Staffs	38
	ESMF Orientation Program for SREP Staffs	Biogas Component-SREP/ESS unit	1	AEPC-SREP Staff	20
	Training Program on Feasibility Study and Detailed Feasibility Study of Large Biogas Plants	Biogas Component-SREP/ESS unit	2	Consulting Firms	29
	Capacity Development Programme on Gender Based Violence	GESI Unit	1	AEPC Staff	93
	Training for Power Output& Household Verification Inspector (POHVI)	AEPC/MQA	4	Power Output& Household Verification Inspector (POHVI)	38

SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
	Orientation Training Programme for Third-party Monitoring Consultants	AEPC/MQA	2	Third Party Monitors	172
	Training to Social Mobilizers in Jan-2019	SASEC & RERL	2	Field Coordinators of SASEC	13
	Solar Mini-grid Engineers Training	AEPC & SASEC	5	Engineers of solar companies and consulting firms	24
	House wiring & Electric Safety Training	SASEC & RERL	7	Participants were from Gutu, Sugarkhal & Malladehi SMG subprojects area	19
	Operational and Management Guideline Preparation Workshop	SASEC & RERL	2	Field Coordinators, Site Engineers & Subproject Developers of SASEC project	34
	Financial Literacy Training	SASEC & RERL	3	Saving and Credit Groups formed in Simrutu MHP Subproject area	114
	Exposure Visit	SASEC &RERL	2	Subproject Developers & Representatives of Rural Municipality	19

SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
	Exposure Visit	SASEC & RERL	2	Subproject Developers & Representatives of Rural Municipality of Chukeni Khola MHP, Jumla	34
	9 Orientation and Interaction program for Local level	Outreach Management	9	Mayor/Chairperson and Chief Administrative Officer of Local Level	753*2 (two from each LG)
	7 RE interaction and MOU Signing Program with Provincial Government (MoPID)	Outreach Management	7	Ministers, Secretary and GoN officials	175
	2 Training and Capacity building activities for PIU staffs and Service Provides	Outreach Management	4	Team leaders, Engineers	32
	Micro Hydro Operation Training In Butwal, Rupandehi	CESC	22	Micro Hydro Operator	25
	Micro Hydro Operation Training In Kathmandu Valley	CESC	22	Micro Hydro Operator	25
	Micro Hydro Management Training In Kathmandu Valley	CESC	7	Micro Hydro Manager	25
	Micro Hydro Management Training In ButwalRupandehi	CESC	7	Micro Hydro Manager	25
	Interaction on modalities of solar energy sector	SESC	1	Solar Electric Manufacturer's Association	81

SN	Name of Training/Capacity Building Activities	Organizer (Component/Unit)	Duration (Days)	Target Group	People Trained (No)
	Training of Potential Entrepreneur/ Training of starting Entrepreneur (ToPE/ToSE)	Productive End Use section	7 days	PEU component, Regional PEU staff, Other AEPC component	25
	Training of Existing Entrepreneur/ Training of Growing Entrepreneur (ToEE/ToGE)	Productive End Use Section	5 days	PEU component, Regional PEU staff, Other AEPC component	20
	Training on Irrigation design	Productive End Use Section	3 days	PEU component, Renewable World, Solar Component, other Engineer of AEPC	13
	Advanced MS Office Package Training	Productive End Use section	14 days (morning / day)	PEU and other component of AEPC, RERL	27



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