Government of Nepal
Ministry of Energy, Water Resources and Irrigation

Alternative Energy Promotion Centre

Progress at Glance: Year in Review

FY 2076/77 (2019/20)
And FY 2077/78 (2020/21)

Description of Photographs Used in report (in the order they appear in front of each chapter)
Solar Minigrid Project (150 kWp) at Thawang Rural Municipality, Thawang, Rolpa (Cover Page)

Hon'ble Minister Pampha Bhusal observing Biogas plant at Gandaki Urja, Pokhara

Maluwa Fokta Khola MHP 31 kW, Jumla

Welcoming Mr. Devendra Karki, Secretary, Ministry of Energy, Water Resources and Irrigation at AEPC

Support to Manang District affected by flood and landslide

Electrical Safety Awareness Program at Khatyad Khola Mini Hydro Subproject, Mugu

Agro Mill operated by Solar Mini Grid at Gutu

Woman cooking on electric cookstove in rural Nepal.

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Fiscal Year 2019/20 and 2020/21
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FY 2076/77 (2019/20)

And FY 2077/78 (2020/21)

Hon. Pampha Bhusal
MINISTER
Energy, Water Resources and Irrigation

Pampha Bhusal
Minister
Ministry for Energy, Water Resources and Irrigation

Government of Nepal
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Ref. No.:

Message from the Chair of the AEPC Board

As Alternative Energy Promotion Centre (AEPC) is approaching 25 years since its establishment, it gives me immense pleasure to extend felicitations both on my personal behalf and on behalf of the Ministry of Energy, Water Resources and Irrigation (MoEWRI) for its glorious services in renewable energy development and promotion in the country. Despite the recent difficult times arising due to the global COVID-19 pandemic, AEPC has been able to significantly achieve its desired annual target for fiscal year 2019-20 and 2020-21 for which I congratulate the entire team of AEPC for their meticulous efforts and continuous devotion towards improving access to clean energy through rural and renewable energy technologies like mini/micro hydropower, solar, biogas and improved cook stoves thereby reducing dependency over traditional and imported energy.

The Government of Nepal continues to accord high priority for sectoral development of the RE sector in the country. With abundance of renewable energy resources available in the country, the government has prioritized harnessing renewable energy for providing reliable and uninterrupted energy supply to meet the growing domestic energy demand thereby being a key input to fulfill its aspirations both for economic growth and energy security of the country. Even with the rapid expansion of the national grid to most parts of the country, the promotion of off-grid renewable energy systems still holds much significance for providing modern energy services to the 'last mile' population of highly scattered settlements. Nepal is one of the very few countries in the world, if any, to adopt State Policy for renewable energy development in the Constitution for conservation, management and use of natural resources. The Government of Nepal has, over time, formulated various policy documents such as the Rural Energy Policy 2006 and various Renewable Energy Subsidy Policies to instigate and promote renewable energy technologies. Nepal's Second Nationally Determined Contributions 2020 has focused on mitigating climate change by promoting renewable energy.

Looking forward, the Government of Nepal has drafted the Renewable Energy Promotion Bill that will help to further strengthen and regulate this emerging sector and also provide a legal basis to the sector especially relevant in the changed context of federalism in the country. Likewise, the Government is working on the proposed Energy Conservation Act which will establish legal and institutional arrangement for the promotion of energy efficiency.

The wide-ranging support of stakeholders including the Development Partners to the government's endeavors on renewable energy have been significant. I would like take this opportunity to thank the Development Partners, private sector, civil societies and all stakeholders for their continuous support in the government's endeavors which has invigorated the sector to attain new heights despite numerous challenges including the COVID-19 pandemic. I am happy to acknowledge that our combined efforts are especially noteworthy as it has ensured improved access to modern energy services to more than 18% of rural remote households of the country that were beyond grid connectivity. Finally, I once again congratulate AEPC for their successes during the reporting period and also these 25 glorious years of providing valuable basic human services in rural areas and also wish for continued success in the future too.

Pampha Bhusal
Honorable Minister for Energy, Water Resources and Irrigation
Chairperson, Alternative Energy Development Board

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Message from the Secretary

The role of Alternative Energy Promotion Center (AEPC), the nodal government agency for the promotion of renewable energy in Nepal, has been commendable as the country strives towards achieving universal access to clean, reliable and affordable energy solutions. Even in difficult times arising due to the global COVID-19 pandemic, AEPC has been able to significantly achieve its desired annual target for fiscal year 2019-20 and 2020-21 for which I congratulate the entire team of AEPC. This summarizes main achievement of the period. I am happy to note that, since its establishment, AEPC has generated more than 72MW electricity through off-grid electrification solutions and has been providing clean energy services to more than three million households with a blend of renewable energy technologies. The dissemination and promotion of clean lighting and cooking solutions have had a substantial impact on the quality of lives of local communities in rural remote areas of Nepal. The 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. Renewable energy is still the most locally accessible and available source of energy in remote areas which contributes to reducing carbon emission, ensuring reliable power supply and diversification, enhancing energy security and reducing dependency on imported fossil fuels. AEPC has been significantly 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.

Strategically, the 15th Plan of the Government of Nepal aspires for a 12% contribution of renewable energy in the total energy consumption by FY 2080/81 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. The need of the sector going into the next generation is grid interconnection, clean cooking, scaling-up of technologies, sustainability of systems, affordable renewable energy finance and integrated energy planning. For this, the government is committed for a conducive policy environment 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 universal energy access to all.

As renewable energy is a key component in the White Paper of the Ministry, special initiatives have been conceived such as 'Every Home Energy Home' on energy efficiency, Solar Mini Grid program targeting mountainous and upper hilly regions, 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 renewable energy technologies at each local level of the country. AEPC has an important role in assisting provincial and local governments in designing policies, regulations and procedures on renewable energy development and promotion.

We are passing through difficult times with the COVID-19 pandemic over the past 18 months or so. In spite of this, I am extremely delighted to note and also share significant achievements of AEPC over the last two years and would like to congratulate the entire team of AEPC, External Development Partners and stakeholders. On this very occasion, I also take the privilege to extend my best wishes to AEPC and all stakeholders for completing 25 illustrious years of delivering services to the rural remote communities of Nepal and wish for continued effort and profound spirit in forthcoming years.

Devendra Karki
Secretary, Ministry for Energy Water Resources and Irrigation
Member, Alternative Energy Development Board

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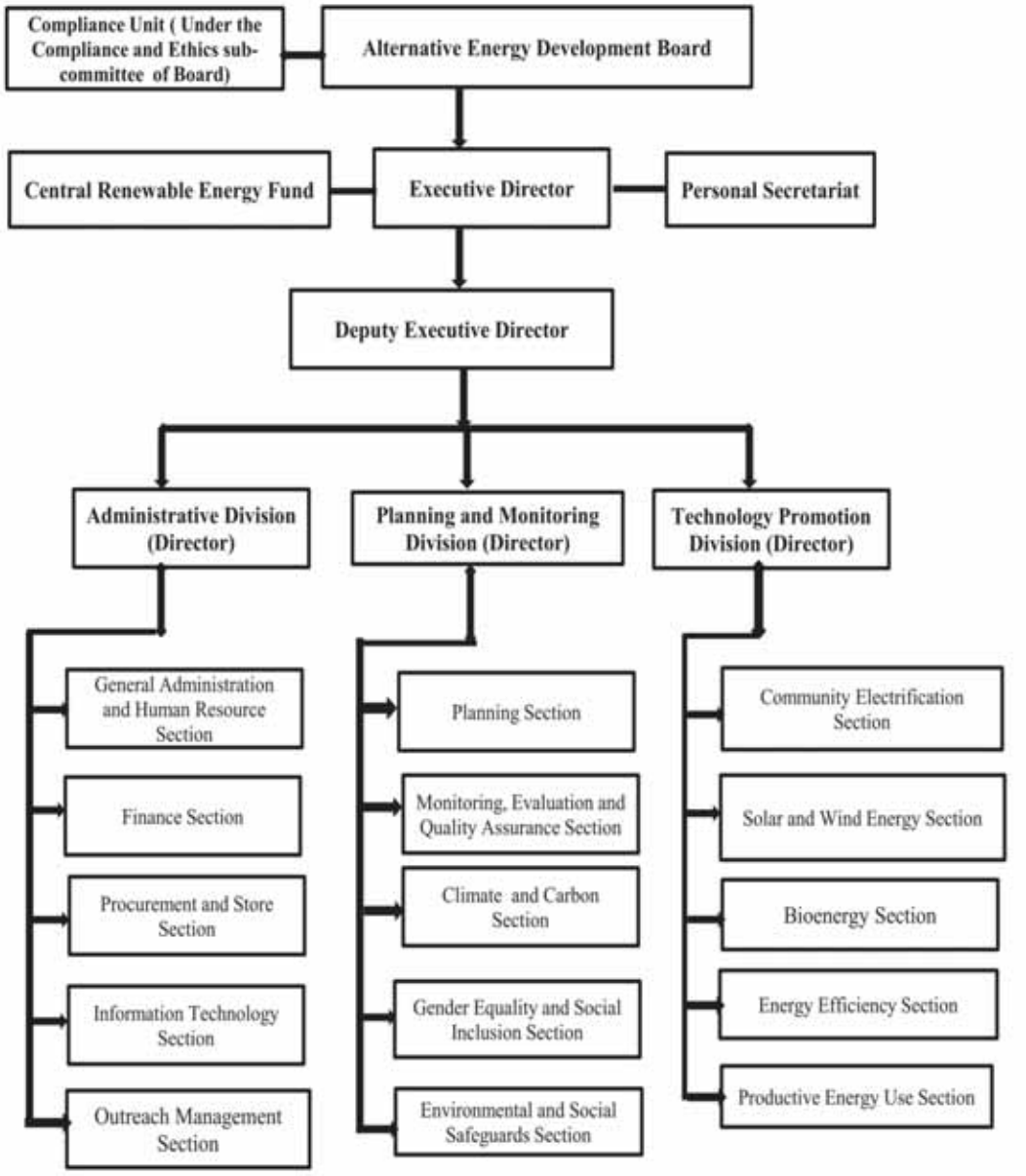
Member Secretary
Executive Director, AEPC

ORGANIZATIONAL STRUCTURE of AEPC



EXECUTIVE DIRECTOR'S REPORT

Alternative Energy Promotion Centre (AEPC), established on 3rd November 1996 under the aegis of the Development Board 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. Energy efficiency is a new mandate given to AEPC by the Government of Nepal. AEPC seeks to adopt measures to address, primarily in rural areas, the predominant energy poverty and provide viable renewable energy options against the use of traditional and imported fossil fuels.

Nepal has the highest energy intensity, which measures the amount of energy used against the GDP of a country among the South Asian countries. About 68.6% of the total energy consumed in the country still comes from biomass and the share of the commercial energy is only about 28.2%, renewable energy accounts for about 3.2% of total energy consumption. Nepal aims to maximize utilization of its vast hydropower potential to reduce its dependence on traditional biomass and imported fossil fuels to drive its economy. Besides developing hydropower, Nepal is also promoting utility scale solar PV and wind energy to diversify its power generation mix to meet its ambitious target of 15,000 MW generation capacities by 2030 with increment of per capita electricity consumption of 1500 kWh.

The Constitution of Nepal 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 FY 2080/81. The Plan aims to provide access to electricity to additional 5% of the total populations through 13 megawatts of micro and mini hydropower, 127 megawatts of solar and 10 megawatts of wind energy and also implement climate change adaptation plans at 550 local levels from the existing 217. The Plan further envisages installing 200,000 household biogas plants and 500,000 improved cooking stoves and thermal gasifiers, 20 thousand metric ton annual production of bio briquette and pellets, 2 more carbon projects and annual replacement of 40 thousand metric ton of liquefied petroleum gas through installation of 500 large biogas plant. The Ministry of Energy Water Resources and Irrigation (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.

As we reached our 25 years of establishment, we reflect on our many accomplishments primarily possible through the continuous financial and technical support of the Government of Nepal and development partners, dedication of our staff and the fervor of the private sector and local communities that have contributed tremendously to the achievement of our ambitious goals. Over the years, AEPC has supported over 14 million people across country realize their energy needs through appropriate deployment of renewable energy technological needs, subsidy and credit. More than 500 private service providers and umpteen numbers of local communities are leading service delivery creating direct and indirect employment opportunities to well over 30,000 people.

Despite the COVID 19 pandemic and the subsequent lockdown that brought the whole nation to a standstill, at AEPC we have given our utmost effort to deliver services while creating a conducive policy environment for the participation of private sector and non-governmental stakeholders for promotion and development of renewable energy in the country. In partnership with development partners, programs like Scaling Up Renewable Energy Program (SREP) for commercial-scale large biogas, South Asia Sub-regional Economic Cooperation

(SASEC) for enhancing access to renewable energy services in off grid areas, Renewable Energy for Rural Livelihood (RERL) for promotion of mini hydropower, large solar PV and productive energy use, Nepal Mini Grid Project (NMGP) 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 are being implemented. The project is implementing new modal of financing of innovating RE technologies through Challenge Fund replacing old subsidy model to result based Viability Gap Funding (VGF). The got the approval Operation Manual of Central Renewable Energy Fund (CREF) from MOEWRI and Ministry of Finance including VGF financing concepts.

In terms of the progress made during the years 2019/20 and 2019/20 we have been able to generate an additional 1,986 kW taking the total to more than 72MW of electricity, mostly in off-grid rural areas, through renewable energy resources till date. In 2019/20 soft loan and interest subsidy for the connection of solar into the national grid achieved an overwhelming response with 3,256 kW being connected to the national grid. In 2020/21, the mini grid projects generated 521 kW of electricity. The solar pumping for agriculture irrigation overachieved its targets in both the years with 525 and 524 commercial farming supported in 2019/20 and 2020/21 respectively. Similarly the installation of portable metallic improved cookstoves benefitted 10,465 households in the year 2019/20 and the clean energy program for replacement of traditional cooking practices using dung cakes and agriculture residue was able to support 19,898 households in 2020/21 ensuring better health coupled with socio-economic benefits. As the nation gears towards the stage of self sufficiency in electricity generation, our programs and projects on electric cooking for households will ensure the internal consumption of electricity within Nepal. On the energy efficiency front, AEPC concentrated its efforts on development of benchmarks and establishing baselines, awareness on energy efficiency at federal, provincial and local level and energy audits of hospitals, public buildings and industries and developing energy efficiency standard for main household and industrial appliances. AEPC holds eight Clean Development Mechanism (CDM) projects and program of activities (PoA) which contributes as its regular source of revenue. Till date, about 5.1 Million Certified Emission Reduction has been sold equivalent to the 25 Million USD from household Biogas and Micro-hydro projects. In terms of issuance of the certified emission reductions (CERs), the two reporting period stood at 1.5 million CERs. The trading of the CERs during the reporting period garnered by AEPC was also successful in the two reporting periods. The total amount generated from carbon selling in the two reporting period is about 5.2 Million USD. Moving forward at nations gear toward to the NDC targets and voluntary emission reduction, large size biogas as carbon programme in Nepal is being developed for the Internationally Transferred Mitigation Outcomes (ITMO) under article 6.2 of Paris Agreement.

On the institutional front, GESI and ESS are intrinsic part of AEPC's work culture, reflected through our ESS Policy, GESI responsive RE policy, Annual Budget and Work Plan, Additional Subsidy and Credit Facilities. The Compliance Unit, established to strengthen its internal control and system improvement, is functional 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 have further bolstered AEPC's commitment towards accountability and integrity. During the reporting period, we have been able to close all the conditions related with our accreditation to the Green Climate Fund (GCF). The project development process for mobilizing GCF finance remains a high priority and we have given our utmost effort in the development of project proposals. The last GCF board B.30 has approved AEPC project on clean cooking solution (CCS) of total budget USD49.1 million to promoted one million CCS in 150 local government in 22

districts. Which is a major breakthrough for AEPC to get fund from CGF, the center has already submitted few concept note for future projects. In the reporting period AEPC also been trusted delivery partner by Ministry of Finance which is the national designated authority (NDA) of CGF.

AEPC looks forward to work closely 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. In this context, Memorandum of Understanding have been signed with all the seven provinces of the country and technical resources have been deployed to provide necessary support to the provincial governments for the development and expansion of renewable energy. In the previous reporting period, outreach function at AEPC established two Project Implementation Units (PIU) at Province1 and Sudur Paschim Province in coordination with Provincial Ministry of Physical Infrastructure and Development and with support from Renewable Energy for Rural Areas (RERA). Similary NREP is working province 2, Lumbini province and Karnali province in the capacity building local level governments in promotion of renewable energy.

The Nation is still in geo-political transition and the federal setup offers both challenges and opportunities to AEPC. It is imperative that AEPC reposition itself striving towards Centre of Excellence supporting in formulating policies, regulatory frameworks, strategies and plans at all tiers of governments. AEPC, specially, has 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. With over 90% of the population reportedly having electricity access mainly through the rapid expansion of the national grid, there is still enormous scope and relevance of AEPC in providing access to modern energy services to the 'last mile' population that will seemingly still be beyond the reach of the national grid in the foreseeable future while consolidating previous accomplishments for a strengthened integrated energy sector. For this, AEPC look to work in close collaboration with the Nepal Electricity Authority (NEA). AEPC and NEA jointly working on simplified process in connecting microhydro plants where national grid has reached. Under 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 with major focus on accessing international finance in the areas of climate and environment..

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. Hence, promulgation of Act to ensure the legal stability of AEPC remains vital, the government of Nepal has given its consent to draft Renewable Energy Promotion Act and draft is prepared and ready to go to parliament through council of minister. The center is still housed in a rented building and the present management is working to get a piece of land in Babarmahal area and the process is almost complete and in FY2078/79 budget is allocated for design and drawing of AEPC own building.

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.

Dr. 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	CDM Program of 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
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
PoAs	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 pivotal 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. "Between 1971 and 2018, world total energy supply (TES) increased 2.6 times (from 5 519 Mtoe to 14 282 Mtoe) and its structure changed. Oil fell from 44% to 32% of TES between 1971 and 2010; it is stable since then, and still the dominant fuel in 2018. Natural gas consolidated its third rank, growing from 16% in 1971 to 23% in 2018.. Hydro significantly increased in 2018 (+3.5%), providing 2.5% of global energy production in 2018, and setting a record with 362°Mtoe. Solar photovoltaic, wind and solar thermal productions kept increasing in 2018 but at a slower pace (+24.7%, +12.4% and +3.2% compared to +34.9%, +17.6% and +3.2% in 2017 respectively). As for geothermal, its production grew at the same rate in 2018 and 2017 (+7.2%). Nonetheless, they still accounted for hardly 2% of global primary energy production together." [1]. This suggests that there are still avenues to decouple energy production from conventional sources.

Global electricity generation was 2.6% lower in Q1 2020 than in Q1 2019. Renewables-based generation increased by 3%, mainly because of a double-digit percentage increase for wind power and a jump in solar photovoltaic (PV) output from new projects over the past year. The share of renewables in electricity supply neared 28% in Q1 2020, up from 26% in Q1 2019. (IEA, Global Energy Review 2020, Report Extract Electricity). World's largest economies witnessed a fall in energy demand by 6% on average in 2020, as an impact of COVID-19[2]. 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

1 World Energy Balances: Overview (2020 edition), https://iea.blob.core.windows.net/assets/23f096ab-5872-4eb0-91c4-418625c2c9d7/World_Energy_Balances_Overview_2020_edition.pdf

2 https://www.iea.org/reports/global-energy-review-2021/economic-impacts-of-covid-19

capita electricity consumption in the business-as-usual (BAU) scenario from 2015 to 2040 is presented in figure 2[3]. This projection demands enhanced generation of electricity through all available means.

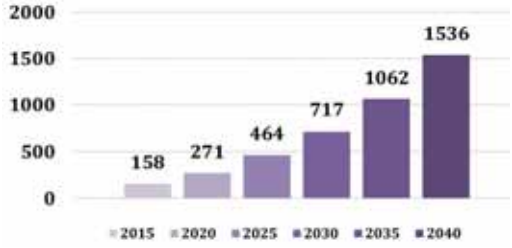

Figure 1: Projection of Energy Consumption for 2015-2040 in kWh, (adapted from WECS, 2017)

1.2 NATIONAL ENERGY CONSUMPTION SCENARIO

Residential / Domestic sector (households) is the primary consumer of energy in Nepal. Household energy consumption as per the Economic Survey 2076/77 B.S. (2019/20) stood at 43.3% in the first eight months of the FY 2019/20 followed by Industrial sector (36.3%). 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). While Traditional Cookstoves (TCS) is predominantly used for cooking in the rural areas, Liquefied Petroleum Gas (LPG) is the most commonly used cooking technology in the urban and peri-urban areas. Moreover, LPG has to be imported and in 2018-19, Nepal imported 429,609 MT of LPG, which is a 270% increase since 2008/09. This over dependence on LPG import has put Nepal in a perilous situation, as it has not only widened the trade deficit, but has also made Nepal very susceptible to risk of energy security. Nepal must curtail its dependency on LPG in order to strengthen its economy and for its sovereignty.

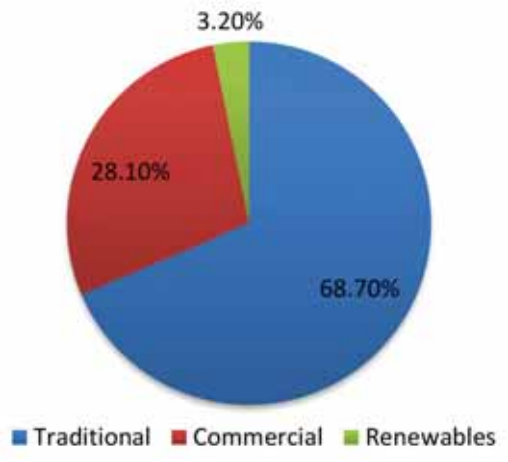

Figure 2: Energy Consumption by Fuel type 2019/20 first eight months, (adapted from MoF, Economic Survey, 2076/77)

However, household's heavy reliance on traditional energy sources (solid fuels) remains alarming. The ratio of conventional, commercial and renewable energy consumption to total energy consumption has been 68.7 percent, 28.1 percent and 3.2 percent, respectively. Figure 3 presents the energy consumption scenario by fuel type in first 8 months of FY 2019/20 (Economic Survey 2076/77 B.S., MoF).

1.2.1 National Electrification Status Access

By mid-March 2020, population having access to electricity has reached 90.0 percent. In comparison to the last fiscal year the total electricity generation has increased by 8.3 percent to 1,355 megawatt (MW). (Economic Survey 2076/77 B.S., MoF).

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

By the end of mid-March of fiscal year 2019/20, about 10.0 percent of the total population have access to electricity from renewable energy sources while 36.0 percent of the population have been using clean renewable energy for various purposes. As of the mid-March of fiscal year 2019/20, 764 kilowatts (KW) of renewable energy has been used from micro and small hydropower projects under alternative energy and 50 KW from solar and wind energy. During the same period, 1,390 biogas plants, 9,858 solar household power systems and 4,847 improved stoves have been installed (Economic Survey 2076/77 B.S., MoF).

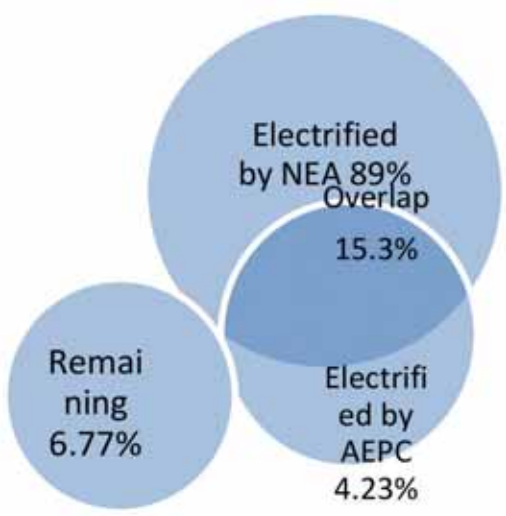

Figure 3: Energy Access Data

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)[4].

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[5]. 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.

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

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

5 The Constitution of Nepal (2015)

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 of revising the NDC 2016 has been completed.

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 white paper of Ministry of Energy, Water Resources and Irrigation (2018)[6] presents the scenario of the renewable energy in Nepal. Above 55 MW of the electricity has been produced by the renewable energy serving 3.6 million 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.

National 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

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

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. .

Fifteenth plan has been adopted by the GoN in FY 2019/20 and up until 2023/24. The plan aspires to for a 12% contribution of renewable energy in the total energy 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.

Second Nationally Determined Contribution (NDC), 2020 By 2030, ensure 15% of the total energy demand is supplied from renewable energy sources; In transport, 25% electric vehicles in 2025 and by 2030, increase to cover 90%; In Residential cooking by 2030, ensure 25% of households use electric stoves by 2025, install 500,000 improved cook stoves, specifically in rural areas and by 2025, install an additional 200,000 household biogas plants and 500 large scale biogas plants

CHAPTER 2

ALTERNATIVE ENERGY PROMOTION CENTRE

2.1 INTRODUCTION

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. AEPC has been mandated for energy efficiency, implementing carbon related projects and working with provincial and local governments for their capacity building in implementing renewable energy and energy efficiency projects.

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 4: 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).

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. With 25 years 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. AEPC has been accredited as the Direct Access Entity of the Green Climate Fund (GCF) enabling it to access climate finance from the GCF. AEPC has been further selected to work as the delivery partner of the Green Climate Fund to implement the GCF Readiness and Preparatory Support Program. 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.

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 the British Embassy Kathmandu-funded, 4.5-year Nepal Renewable Energy Programme (NREP) with the Government of Nepal is implementing a Sustainable Energy Challenge Fund Financial Assistance for Distributed Renewable Energy Projects.

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.

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
- National Climate Change Policy, 2019
- Renewable Energy Policy (Draft), 2014
- Low Carbon Economic Development Strategy (Draft), 2014
- Second Nationally Determined Contributions (NDC), 2020

2.5 CUMULATIVE ACHIEVEMENTS

AEPC has ably promoted renewable energy across all available technological measures, both in the rural and urban areas. In 25 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. The table below depicts the number of renewable energy technologies promoted by AEPC in the reporting period.

Table 1: Cumulative achievement in technology promotion

Program	Unit	Till FY 2019/20	Till FY 2020/21
Mud Improved Cooking Stoves (ICS)	Nos.	1,423,242	1,423,242
Solar Home System	Nos.	933,722	961,925
Domestic Biogas	Nos.	427,532	433,173
Micro/Mini Hydro	kW	34,870	35,986
Institutional Solar PV System	Nos.	2,210	2,808
Metallic ICS	Nos.	94,919	103,387
Portable Metallic Stoves	Nos.	10,465	16,015
Institutional Gasifier	Nos.	33	33
Institutional, Urban and Commercial Biogas Plant	Nos.	275	316
Improved Water Mill (IWM)	Nos.	11,018	11,022
Urban Solar Home System	Nos.	21,144	21,144
Solar Drinking Water and Irrigation Pump	Nos.	1,889	2,446
Solar Mini grid Solar/Wind Min-grid System	kW	741	1,262
Solar Dryer and cooker	Nos.	2450	2457

In its quest to deliver renewable energy services to the people, AEPC has maintained its trust with key EDPs. Effort of AEPC has been recognized and it has received several felicitations and awards. The sector has witnessed competitiveness with about 500 private companies creating direct and indirect employment opportunities to over 30,000 people. This has led to creation of renewable energy market and more importantly this market has penetrated the entire country.

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 is 7.9 million dollar. SREP is expected to contribute on achieving NRREP targets of large biogas plants especially commercial biogas plants and waste to energy projects. SREP funding is 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, supported by Asian Development Bank (ADB), aims to contribute to Nepal's energy development objectives by mainly scaling up both on-grid and off-grid RE supply. Among the two components of the project, the on-grid component is being implemented by Nepal Electricity Authority (NEA) while the off-grid component is being implemented by AEPC.

The off-grid component is intended to increase the access to renewable energy for improving the livelihoods of people and create employment opportunities especially in rural areas thus improving income and prosperity of rural communities mainly in rural enterprise, education, health and agriculture sectors. The project is consistent with the ADB Country Partnership Strategy which focuses on (i) Improving inclusive electricity access; (ii) RE development; (iii) Regional cooperation; and (iv) Strengthening sector governance.

For the project there is provision of (i) a credit line of $ 5 million from ADB's Special Funds to user communities/ developers for mini-hydro power plants and (ii) $11.2 million grant from the Strategic Climate Fund (SCF) administered by ADB.

The project also provides support to overall enhancement of capacity by implementing the capacity development of programme for AEPC. The physical investments will be reinforced and supplemented by capacity building support to AEPC, including project management support, preparation support for distribution system/rural electrification master plan and feasibility study of utility level wind farm, and parallel livelihood development activities in the project area.

The off-grid component complements NRREP's outputs related to community electrification. 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) Project has been under implementation since 2014 with the primary objective of removing technological, financial, institutional, regulatory, legal barriers for large scale deployment of renewable energy

systems in the country. The initial 5-year project had a total budget of USD 5 million of which Global Environment Facility (GEF) as a part of its Climate Mitigation Portfolio supported USD 3 million and the United Nations Development Programme (UNDP) contributed the remaining USD 2 million.

After the conclusion of GEF-RERL in 2019 as planned, a new phase of RERL was initiated with joint financing of UNDP and ADB. The ADB-RERL seeks to help improve rural livelihood by providing access to clean energy in remote off-grid areas. The project directly contributes to SDG7 and SDG13 by ensuring access to affordable, reliable sustainable and modern energy for all through the development of mini hydro and solar mini grid projects in remote off-grid areas not being currently served by the national electricity grid. Likewise, the project also contributes to increase the share of renewable energy in the national energy mix. Similarly, the project aims to contribute to other SDGs with energy as the entry point. The promotion of productive energy uses of electricity generated has direct linkages with SDG1, SDG8 and SDG12 while the gender component of the project contributes to SDG5.

RERL has supported in the preparation of the Municipal Energy Plans, assisted in the development of various technical and institutional guidelines, establishment of financial instruments such as Vendor Financing Mechanism, Vendor Challenge Fund and Credit Guarantee Mechanism to de-risk private investments, provided construction supervision and development support for mini hydro and solar mini grid projects and conduction of micro financing activities targeting women in RE 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 Sudur Paschim 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


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THANK YOU

CHAPTER 4

PROGRESS OVERVIEW

In FY 2019/20 and 2020/21, 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 2019/20 programs implemented under targeted RE program achieved 52% physical progress against 42% financial progress. Similarly, for NRREP the physical progress stood at 43% against the financial progress of 58%. During the reporting period 2020/21 programs implemented under targeted RE program achieved 76% physical progress against 73.4% financial progress. Similarly, for NRREP the physical progress stood at 54.5% against the financial progress of 54%.

Table 2: Annual progress of AEPC implemented programs

SN	Programs	Progress	%
2019/20			
1.	Targeted RE program (GoN Financed)	Physical	52%
		Financial	42%
2.	NRREP	Physical	43%
		Financial	58%
2020/21			
1.	Targeted RE program (GoN Financed)	Physical	76%
		Financial	73.4%
2.	NRREP	Physical	54.5%
		Financial	54%

4.1 ALLOCATION AND DISURSEMENTS

During the review period, AEPC implemented its activities through two routes; special and targeted programs and NRREP. In 2019/ 20 GoN allocated around 72% of the total budget to implement the Program from two windows; the targeted RE Program and the NRREP under NREF. The remaining fund was provisioned from foreign investment as a grant and loan. GoN allocated 55% of the total budget for NRREP in FY 2019/20.

In 2020/ 21 GoN allocated around 64% of the total budget to implement the Program from two windows; the targeted RE Program and the NRREP under NREF. The remaining fund was provisioned from foreign investment as a grant and loan. GoN allocated 48% of the total budget for NRREP in FY 2020/21.

The total budget allocated for AEPC in both the routes in FY 2019/20 was NPR 3477.70 Million out of which the expenditure was NPR 1805.99 Million. The overall financial progress of AEPC including both the program in the FY 2019/20 stood at 52%. Financial progress of targeted RE program implemented by AEPC during the review period stood at 42% whereas the progress under the NRREP remained around 58%.

The total budget allocated for AEPC in both the routes in FY 2020/21

was NPR 3428.607 Million out of which the expenditure was NPR 2048.84 Million. The overall financial progress of AEPC including both the program in the FY 2020/21 stood at 60%. Financial progress of targeted RE program implemented by AEPC during the review period stood at 73% whereas the progress under the NRREP remained around 54%.

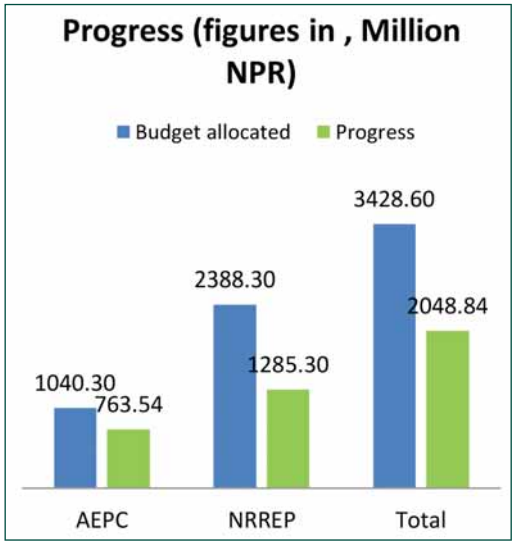


Figure 5: Budget allocated and the progress (in million NPR) (FY 2020/21)

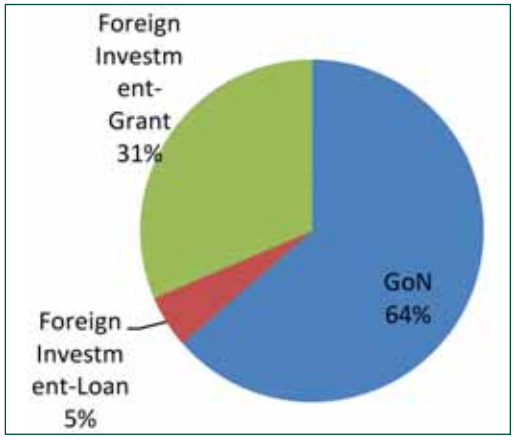


Figure 6: GoN allocation and Foreign Investment (Grant and Loan) in total RE budget in 2020/21

4.2 PHYSICAL PROGRESS

The physical progresses of the given periods are given above. The physical progress achieved during both the reporting periods is detailed in annex 1, annex 2, annex 3 and annex 4.

Due to the COVID 19 pandemic and the subsequent lockdowns the progress has been affected.

1.2.1 Mini & Micro Hydro and IWM Related Activities

The work plan of the FY 2019/20 targeted to produce 2000 kW of electricity through Mini/Micro hydro power. In the review period, 870 kW electricity was produced from the Mini/Micro-hydro

With plan to rehabilitate the MHPs with total capacity of 200 kW which were affected by the 2015 earthquake but MHPs with total 112 kW capacity only could be rehabilitated during the review period.

Regarding the grid connection of the MHPs, out of the target to connect the 3 MHPs in the, 1 was metIn Feasibility study, survey, design, supervision, quality assurance, training and capacity development on community electrification, out of 10 activities, 9 activities were completed standing at the progress of 90%.

The work plan of the FY 2020/21 targeted to rehabilitate incomplete and sick micro hydro, 40%of the target was met. Under NRREP, Feasibility study, survey, design, supervision, quality assurance, training and capacity development on community electrification stood at

80%. Installation of Improved Water Mill fell to 2% only. Pico/Mini/Micro generated 1,116 kW of the targeted 1,500 kW achieving 74% of the target.

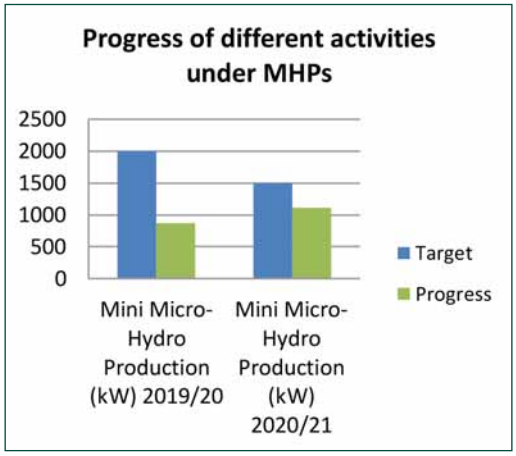


Figure 7: Progress of key micro hydro related activities

Figure 8: Dhungsel Jharna MHP (88 kW) at Rubi Valley Rural Municipality

4.2.2 Solar Energy Related Activities

For the period 2019/20, in terms of progress on activities related to solar energy , installation of solar pumping system for irrigation supporting commercial agriculture, out of 500 planned, 525 was achieved. The installation of solar street light achieved no progress and on the installation of institutional solar, out of 100 municipal offices and ward offices, 69 benefitted. Progress could not be made on solar energy assisted oxygen concentrator in tourist destination. 94% of the target (9,397 out of 10,000) was met on clean energy program for installation of solar energy systems for target and disadvantaged groups. 100% target (2 out of 2) was met on the installation of solar mini grid for mountainous and upper hills.

Under NRREP, the solar mini grid installation witnessed 8% achievement of the physical target; feasibilities, surveys and design stood at 75%; solar rooftop program for residential/commercial/industrial stood at 118%. Soft loan and interest subsidy on solar grid connection achieved an overwhelming target of 326% with 3256 kW installed out of 1000 kW planned. In terms of the Electrification through solar home system in Province 2, Karnali Province and Far Western Province, 53% physical progress was achieved with 10,682 household benefitting out of the 20,000 planned.

For the period 2020/21, in terms of progress on activities related to solar energy, installation of solar pumping system for irrigation supporting commercial agriculture, out of 500 planned, 524 was achieved. Solar home system for areas without access to electricity stood at 120% (6013 out of 5000)

Under NRREP, ISPS achieved 60% achievement of the physical target; Feasibility study, survey, design, supervision, quality assurance,

training and capacity development on solar stood at 88%, Solar home system for the unelectrified households achieved 89% (22,190 out of 25,000)

Figure 9: Solar Street Lighting supported by AEPC

Figure 10: Solar irrigation project

Figure 11: Grid connected solar

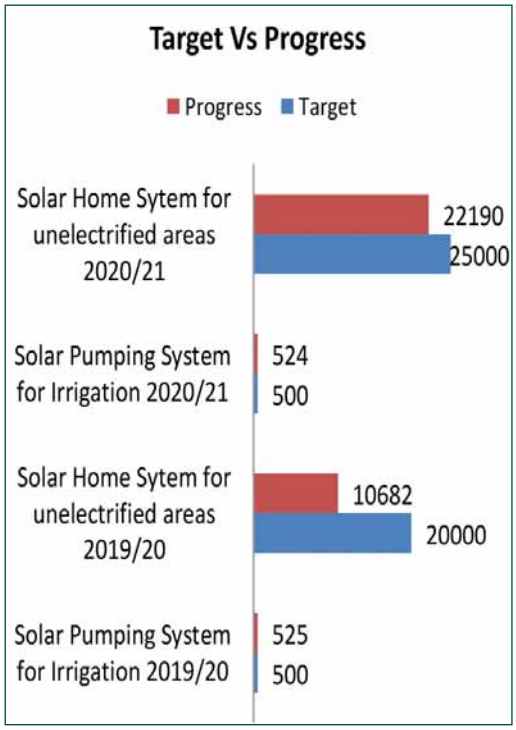


Figure 12: Progress of different activities under solar technology promotion

4.2.3 Bioenergy

In 2019/20, the detailed feasibility studies on large biogas and bioenergy based gasifier thermal system achieved 20% of their targets. Smoke free homes program with installation of two/three pot holes improved cooking stoves for dalits, indigenous, backward classes and poor residing above 1500 metres from sea level achieved 75% of its target (2,990 out of 4,000). Installation of household biogas fell with only 2% progress on the targeted 2500 systems. Smoke free home program with distribution of portable metallic cookstoves to households belonging to target and disadvantaged groups met 105% of

the target with 10,465 installation of 10,000 planned.

Under NRREP, physical targets on access to clean energy with Household Biogas Installation stood at 35%, Community and institutional biogas plant installation at 19% and urban and commercial biogas plant at 28%. The target set out for the rehabilitation for earthquake affected biogas plant could not be met while 70% target was achieved on Feasibility study, survey, design, supervision, quality assurance, training and capacity development activity.

In 2020/21 large biogas constructed under cooperative model stood at 33 % (1 out of 3), Installation of two/three pot holes improved cooking stoves at mountainous and upper hilly region stood at 100% (all 2800 targets met) and Clean energy program: replacement of dung cakes and agricultural residue for cooking stood at 133% (19,898 for the targeted 15,000).

Under NRREP, Community and Institutional Biogas Plant Installation achieved 40% target (12 out of 30), Tier 3 improved cookstoves and rocket stove installation at institutional and household level stood at 52% (5,668 out of 11,000) and rehabilitation of earthquake affected biogas plants achieved 130% (6,513 for the targeted 5,000).

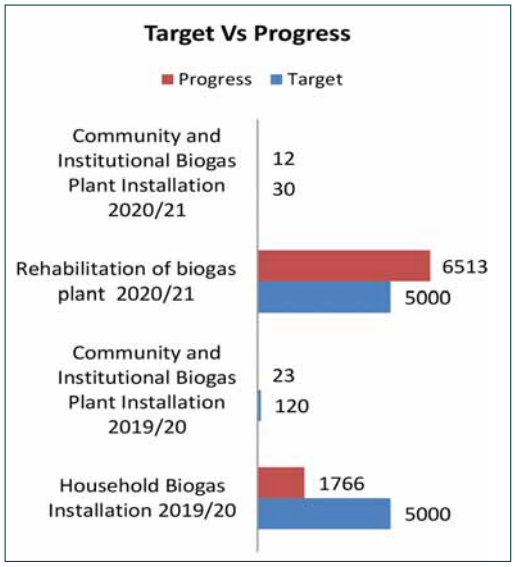


Figure 13: Progress of biogas technology

Figure 14: Metallic Improved Cookstove

Figure 15: Large biogas plant

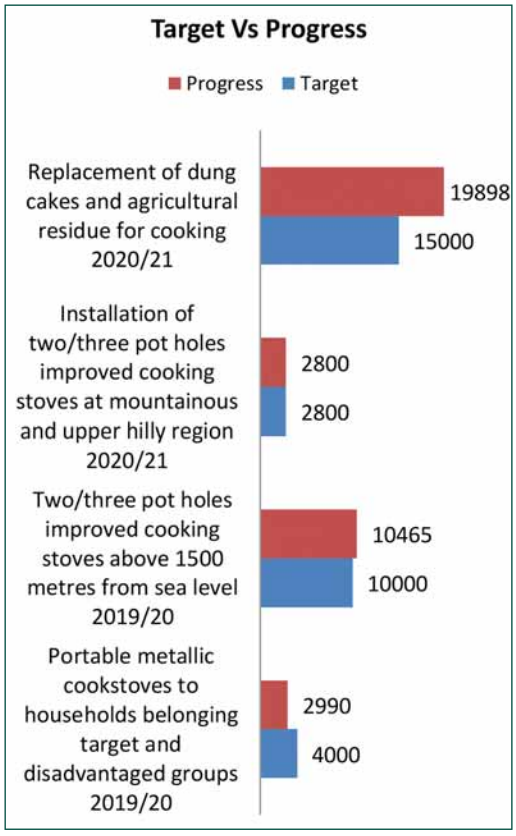


Figure 16: Progress of improved cookstoves

4.2.4 Wind Energy

In the reporting period 2019/20, targets on Data logger installation for mapping wind energy feasibility and Electrification through megawatt scale wind farm in public private partnership were not met. The SASEC related activities witnessed 90% achievement which includes Solar and Solar/Wind Mini-grid Systems and Mini Hydro Mini Grid System.

In the reporting period 2020/21, the SASEC related activities witnessed 88% achievement which includes Solar and Solar/Wind Mini-grid Systems and Mini Hydro Mini Grid System.

Figure 17: Mityal, Palpa Solar Wind Mini Grid

Figure 18: Solar Wind Mini Grid at Chisapani, Sindhuli

4.2.5 Productive Energy Use activities

In the FY 2019/20, the target on Productive energy use for small and cottage industries operated by target and disadvantaged group was not met Under NRREP, Increase in employment and commercial activities with Productive Energy use Promotion met 38%of its target. Feasibility study, survey, design, supervision, quality assurance, training and capacity development on productive energy use met 50 % (10 out of 20) of its target.

In the reporting period activity on productive energy use stood at 162 % (81 for the targeted 50),

Figure 19: Productive End Use Led by Women at Gutu, Surkhet _ Gutu Solar Mini Grid Subproject.

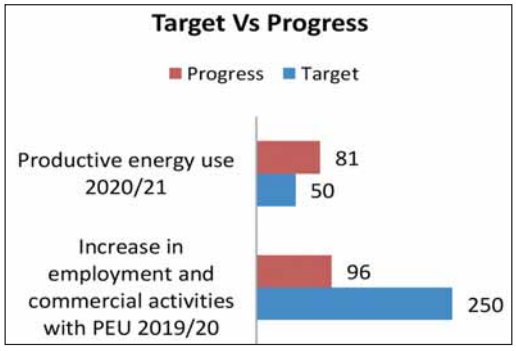


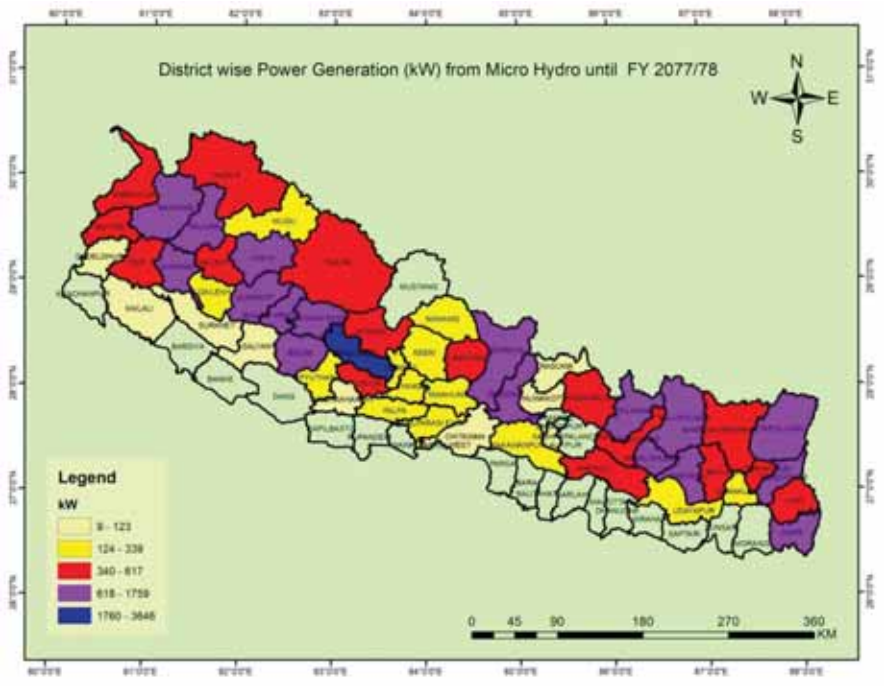
Figure 20: Progress of PEU activities

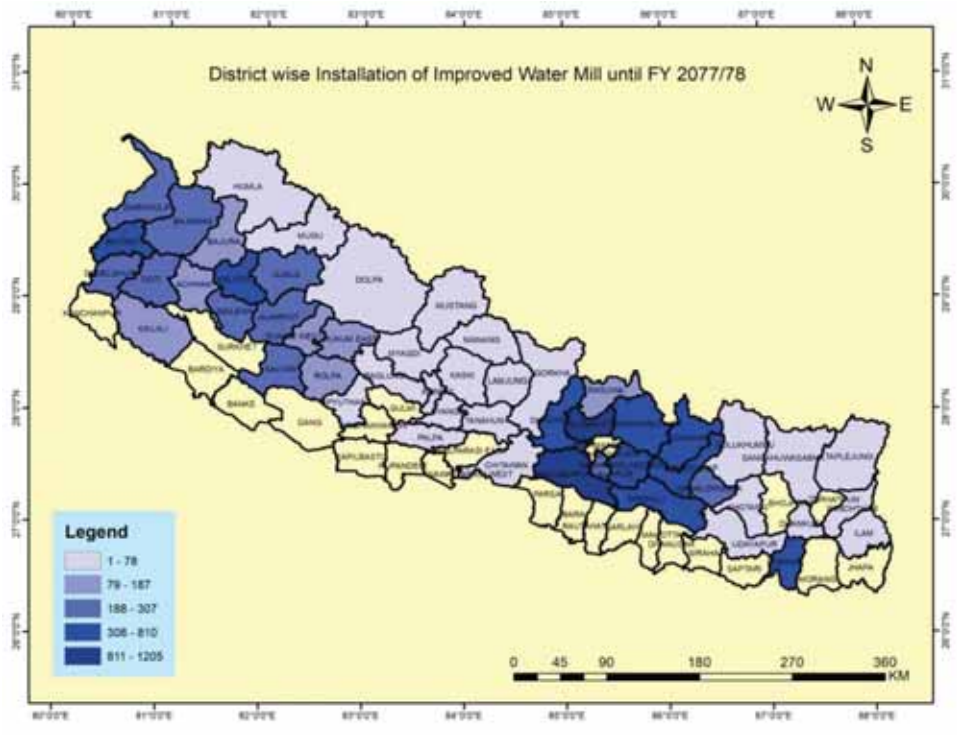
4.2.6 Energy Efficiency

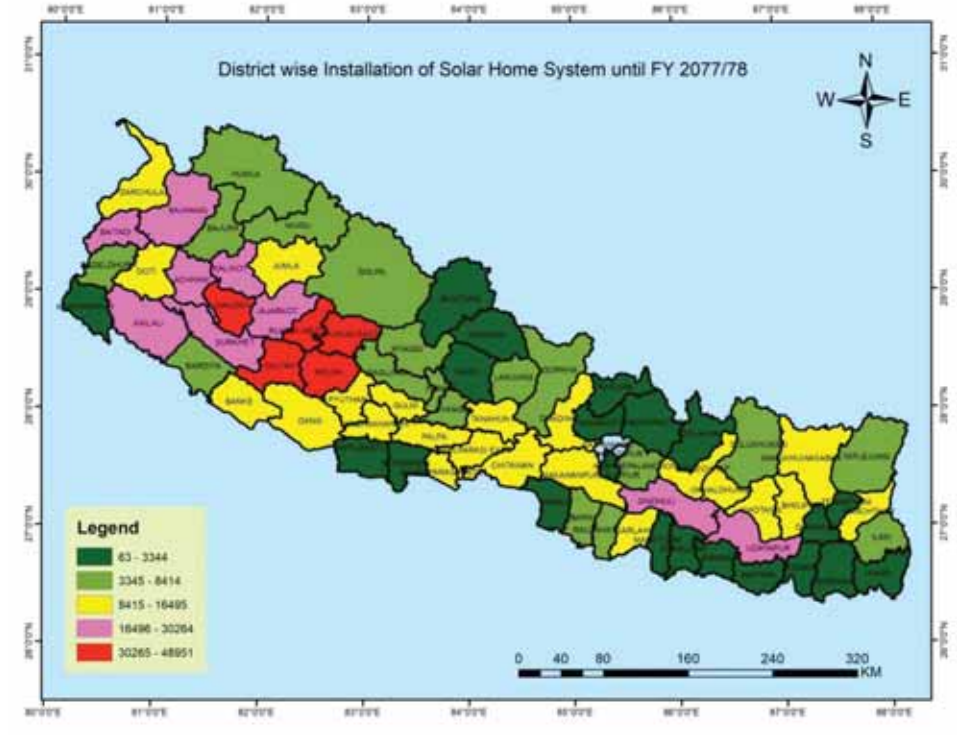
In the reporting period 2019/20, 30% of the target was met on awareness on energy efficiency and 38% on activities related to the implementation of the National Energy Efficiency Strategy. Energy Audit of high energy consuming commercial/industrial entity and application of energy efficient measure stood at 40%.

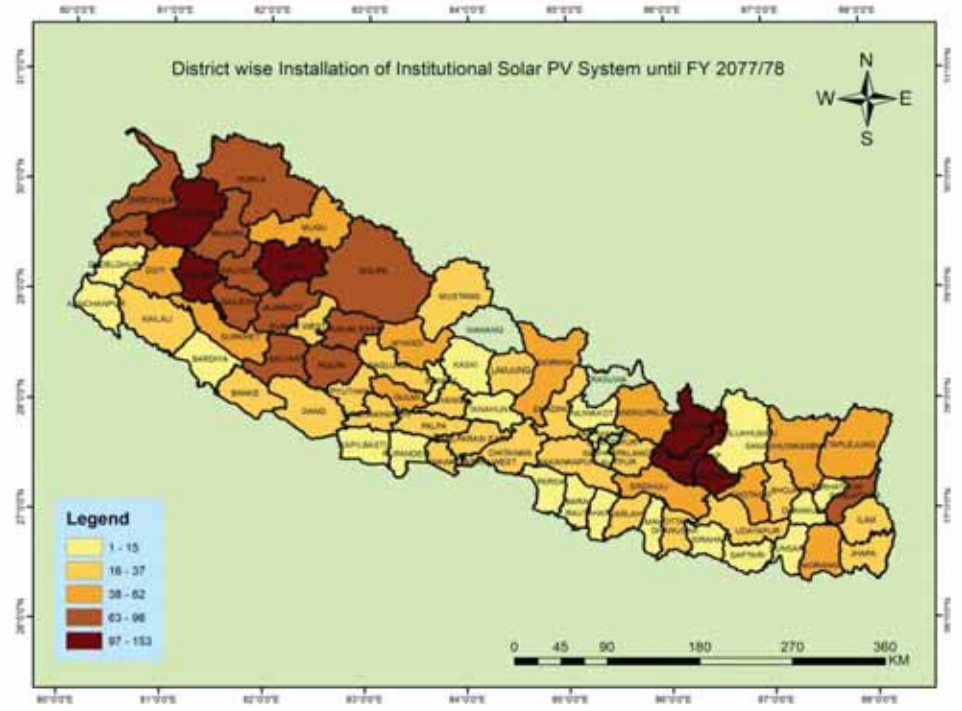
In the reporting period 2020/21, Implementation of energy efficiency program at federal, provincial and local level stood at 80%, Energy consumption assessment of industries, hospitals, commercial and public buildings at 100% (2 out of 2) and energy audit stood at 100% (6 out of 6).

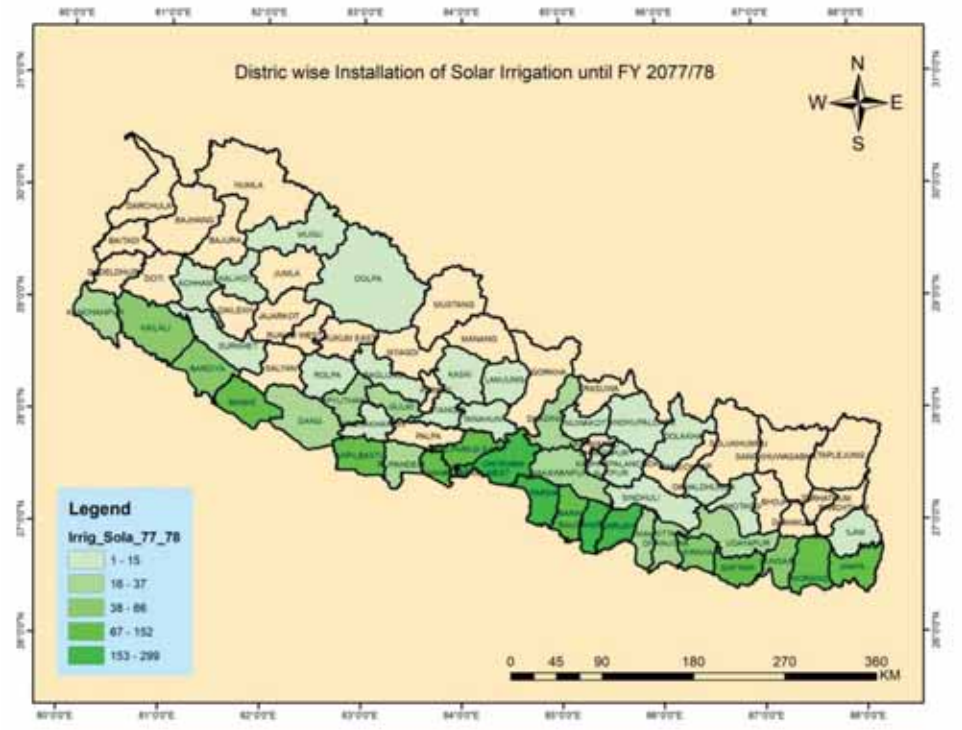
4.3 GIS MAPS RENEWABLE ENERGY TECHNOLOGIES

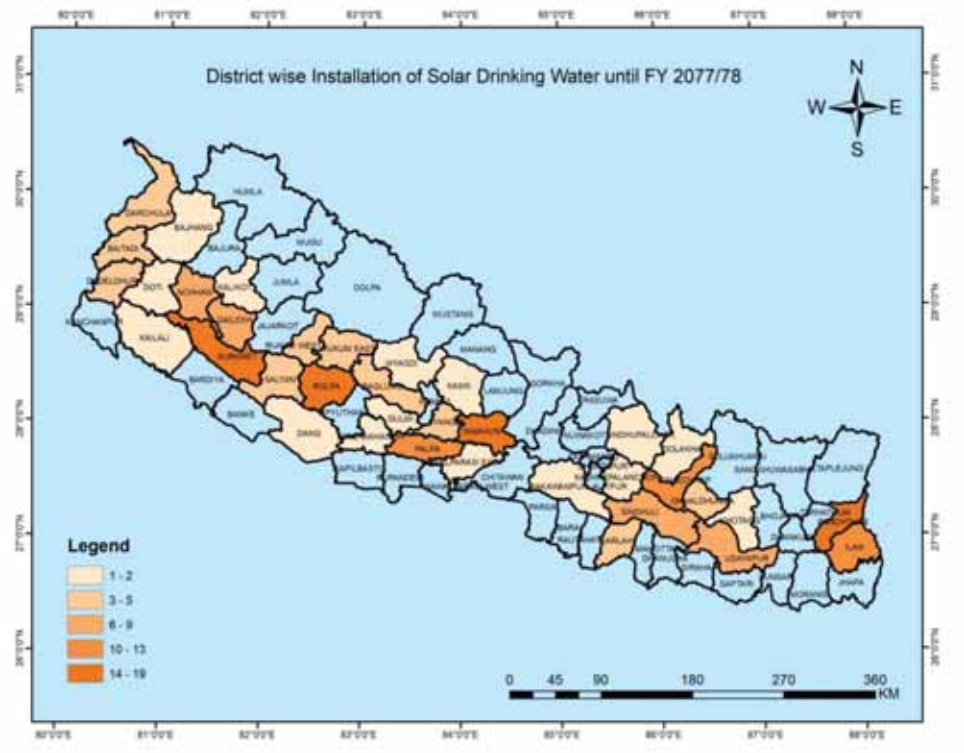


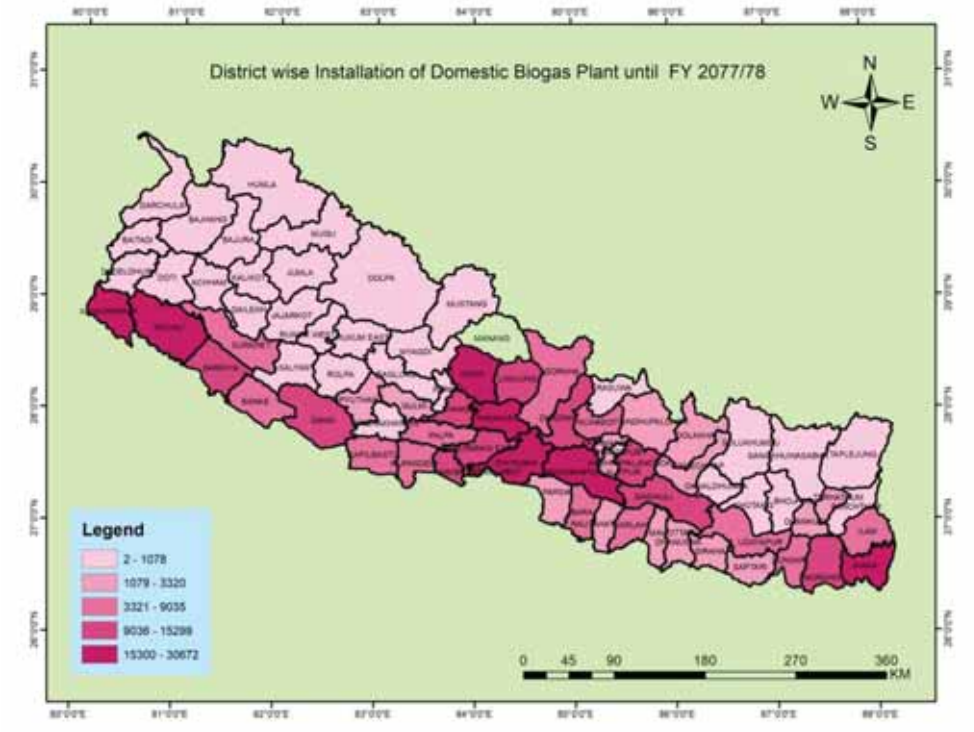

District wise Installation of Improved Water Mill until FY 2077/78
N
W
E
S
Legend
1 - 78
79 - 187
188 - 307
308 - 810
811 - 1205
0 45 90 180 270 360
KM

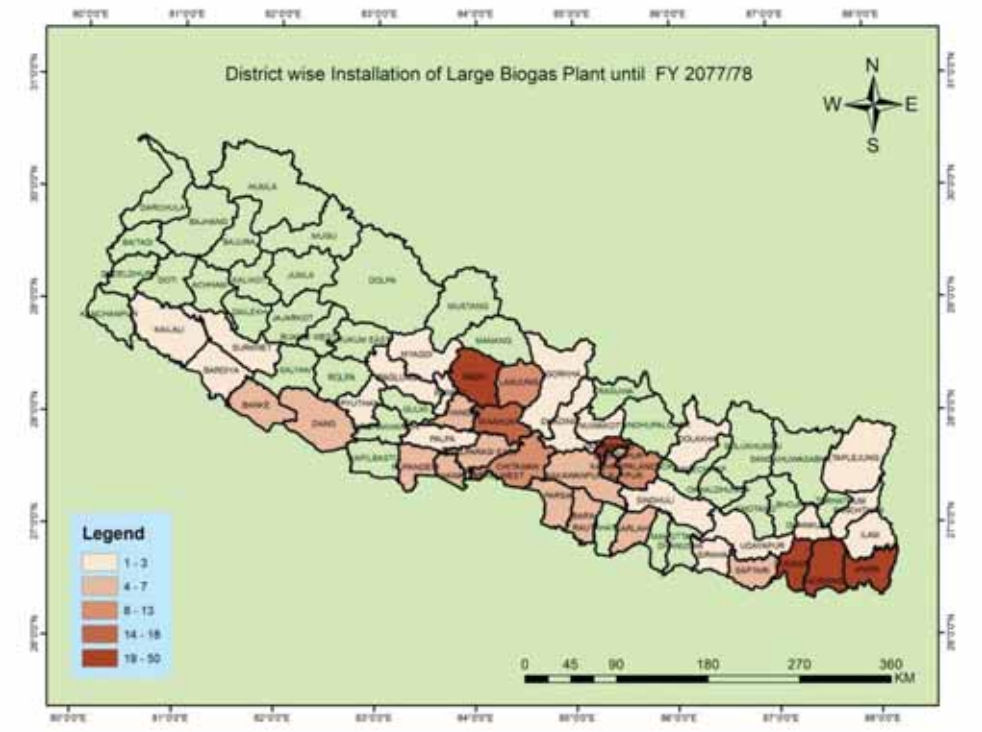

District wise Installation of Solar Home System until FY 2077/78
N
W
E
S
Legend
63 - 3344
3345 - 8414
8415 - 16485
16486 - 30264
30265 - 48951
0 40 80 160 240 320
KM

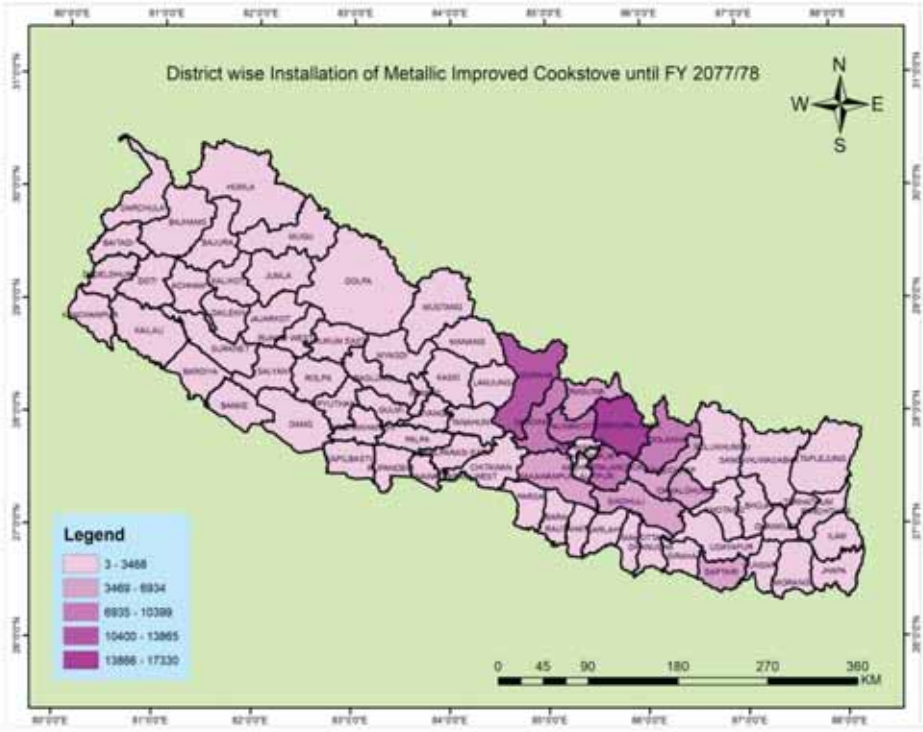

District wise Installation of Institutional Solar PV System until FY 2077/78
N
W
E
S
Legend
1 - 15
16 - 37
38 - 62
63 - 96
97 - 153
0 45 90 180 270 360
KM


Distric wise Installation of Solar Irrigation until FY 2077/78
N
W
E
S
Legend
Irrig_Sola_77_78
1 - 15
16 - 37
38 - 66
67 - 152
153 - 299
0 45 90 180 270 360
KM


District wise Installation of Solar Drinking Water until FY 2077/78
N
W
E
S
Legend
1 - 2
3 - 5
6 - 9
10 - 13
14 - 19
0 45 90 180 270 360
KM


District wise Installation of Domestic Biogas Plant until FY 2077/78
N
W
E
S
Legend
2 - 1078
1079 - 3320
3321 - 9035
9036 - 15299
15300 - 30672
0 45 90 180 270 360
KM


District wise Installation of Large Biogas Plant until FY 2077/78
N
W
E
S
Legend
1 - 3
4 - 7
8 - 13
14 - 18
19 - 50
0 45 90 180 270 360
KM


District wise Installation of Metallic Improved Cookstove until FY 2077/78
N
W
E
S
Legend
3 - 3468
3469 - 6934
6935 - 10399
10400 - 13865
13866 - 17330
0 45 90 180 270 360
KM


प्रशासनिक विद्युत उपभोगहरुका लागी
विद्युतिय जोखिम तथा सुरक्षा आवश्यकता
अभिमुखिकरण कार्यक्रम

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 held from 26th to 28th February 2019 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. Out of 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. Funding proposal for the project titled "Mitigating GHG emission through the use of modern climate friendly clean cooking solutions" has been submitted to the GCF. Furthermore, AEPC has

been endorsed by the MoF (National Designated Authority for the GCF) as the delivery partner to implement the GCF Readiness and Preparatory Support Programme. Subsequently, AEPC has submitted its readiness proposal to the GCF.

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 3.4 Million Certified Emission Reduction has been sold equivalent to the 19.65 Million USD from household Biogas and Micro-hydro projects.

In terms of issuance of the certified emission reductions (CERs), the two reporting periods stood at 1.5 million CERs.

In the reporting periods, Biogas Project activities and PoA generated 1.47 Million CER whereas the integrated water mill PoA generated 41,151 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 the two reporting periods. The total amount generated from carbon selling in the two reporting period is about 5.2 Million USD. Development of Large Size Biogas as Carbon Programme in Nepal is proposed for ITMO under article 6.2 of Paris Agreement

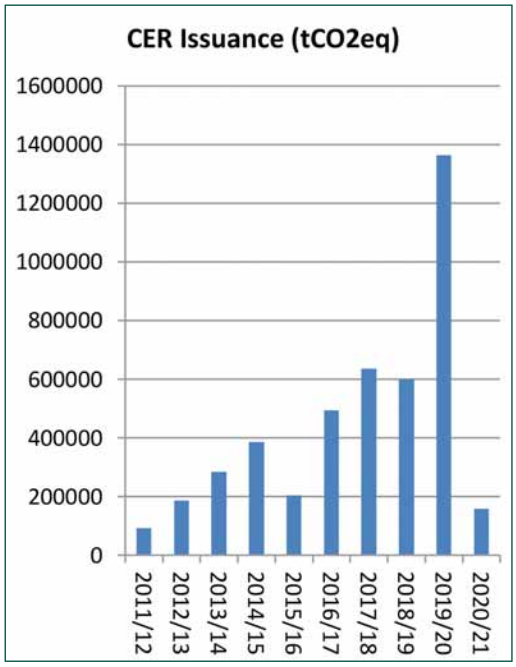


Figure 21: Year wise issuance of CERs (in '000)

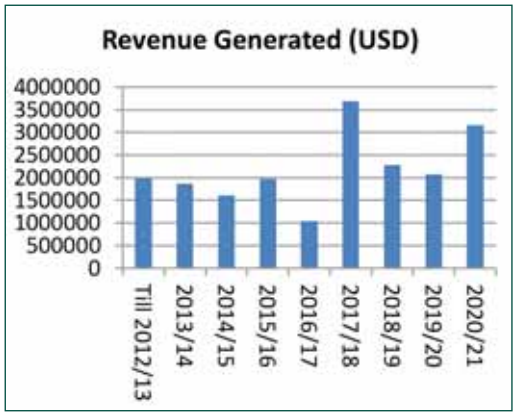


Figure 22: Year wise carbon revenue earning (in M USD)

5.1.2 CDM Audits

Verification audit of the Biogas Project Activities and Nepal Biogas Support programme-PoA was initiated in the reporting periods. Field verification was completed in the reporting period by Designated Operational Entity (DOE). Similarly, the first two

verification of the Improved Water Mills PoA generated 41,151 CERs.

5.2 GENDER AND SOCIAL INCLUSION

The GESI activities are internalized across all technologies. Different activities have been conducted in the area of GESI focusing on the increase of renewable energy systems in off grid areas, these include (i)Women trained in the construction, O&M of mini grid systems and as customer service providers, (ii) Enhanced women and disadvantaged groups participation in project development (iii) Development of women-led micro-enterprises (iv) Trainings in GESI-based community participation and management of energy systems.

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. Diffferent projects have performed various activities in the area of ESS. These include (i) Preparation of Standard Operating Procedure for workplace/ construction sites/large scale biogas plants considering COVID-19 pandemic and its implementation (ii) ESS monitoring of various projects (3) Environemtal and Social Screening (4) Preparation of ESIA, ESMP and reports (5) Orientation and trainings on Environmental Acts and Regulations.

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 it's establishment. The compliance and ethics sub-committee met a total of seven times during the two reporting period despite the impact of COVID 19 and was able to delve in to the matters related to compliance and integrity. The reporting period also saw the fulfillment of all the fiduciary conditions in relation to the Green Climate Fund Accreditation Process.

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.

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 user committees were trained. Trainings were held in the productive energy use.

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

ICS and biogas remained to be the key technologies providing the households with clean energy for cooking. During the reporting period, more than 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 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. It can significantly reduce the respiratory and pulmonary health related illness. 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. The efficiency of the clean cooking solutions is financially and economically beneficial for the households using them. 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.

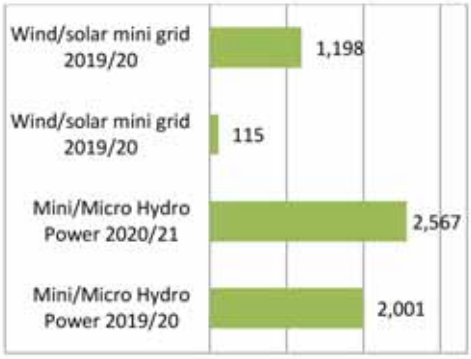
Technology Transfer: Some of the renewable energy technology such as large biogas and wind offers new technological option for the users to get familiarized with. On broader perspective, the local market will also have opportunity to enhance their technological know-how on new advancements on these technologies.

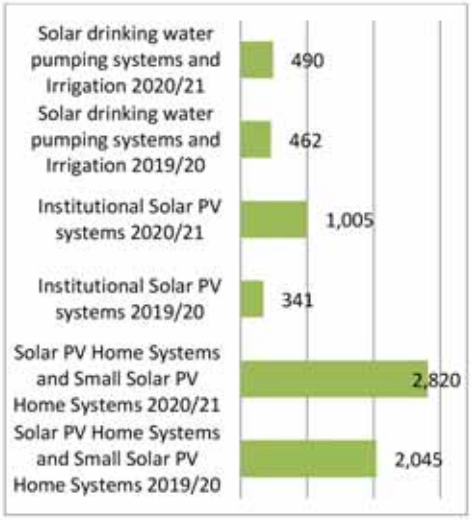
The technologies implemented during the reporting periods helps in achieving the Sustainable Goal 3, goal 7 and goal 13 directly whereas it also helps significantly in achieving the goal 1, goal 2, goal 4, goal 5, and goal 6 whereas complements to achieve other goals as well.

Figure 23: 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 two reporting period is 101,660 tCO_2eq. The detail technology wise emission reduction achieved is given in figure 28. The amount of emission reduction given above are the estimated amount of emission reduction and does not resembles to the tradable CERs.





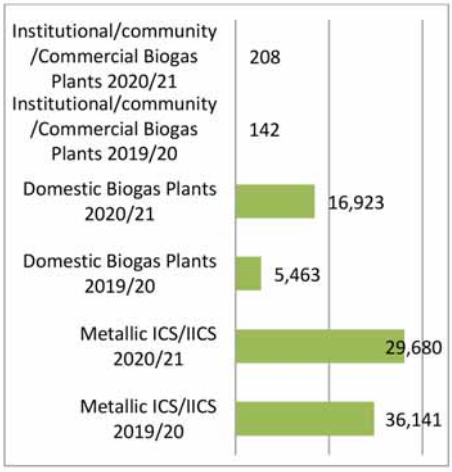


Figure24: Emission Reduction Achieved by RETs installed during reporting period

6.4 SUCCESSFUL CASE STUDIES

Grid Interconnection of Syaurebhumi MHP

Mr. Sudarshan Budathoki, a resident of Sikre VDC, Nuwakot district adjoining the Kathmandu Valley, is a rural entrepreneur who installed the 10 kW Syaurebhumi Micro Hydropower Plant (MHP) in his village in 1998 with his own resources and distributed electricity to fellow villagers. After the MHP came into operation, the demand for electricity increased day by day, as neighboring villages also wanted access and people who already had access wanted more to operate their televisions and other appliances. However, it took 10 years to complete the work. The bureaucratic processes required a lot of running around and were very frustrating - he could not get any financial support from the government because the policy of the time had no provision of grant to private parties. He recalls his grievance, "I was busy every second of my waking hours. At every stage, I experienced innumerable hurdles which never seemed to end but I never gave up. There was absolutely no one to help me and I invested everything I had in the project." He finally managed to complete the 23 kW MHP in 2013, with personal investment of NRs. 600,000 and a loan of NRs. 3.8 million from the Nabil Bank. But unfortunately, his happiness was short-lived as the national grid reached the vicinity of the MHP site during the construction period. Although 240 households from 7 wards of the VDCs were expected to be connected to the plant, only 180 households subscribed, reducing the expected revenue drastically. Unable to repay his loan on time as interests continued to pile up and his woes increased having owed NRs. 4 million to bank to the date.

As per the provision in the Electricity Act 1992, which clearly mentions that the Nepal Electricity Authority (NEA) has to compensate the MHP owner if the grid reaches its catchment area, he approached them to sell surplus power. He lamented that the "bureaucratic red tapes were so frustrating; I almost gave up the idea of selling electricity to the grid and paying off all my loans. This is when I approached AEPC and RERL for technical assistance. With their proactive involvement and pursuance, particularly in technical negotiations and preparing guidelines, I finally managed to conclude the Power Purchase Agreement (PPA) with NEA under the prevailing rates of NRs. 4.80/kWh in wet season and NRs. 8.40/kWh in the dry season as applicable to hydropower projects up to 25 MW. This is a major breakthrough and people who are in the same situation as me now have glimmer of hope for recovering their sunk investments."

Socio-economic empowerment – Gutu SMG Project

Ms. Padma Ramjali, aged 31, is an entrepreneur. She has competed her +2 education. There are three members in a family. Ms. Ramjali started tailoring business and always faced problems to iron clothes because she needed to collect coal for heating fire-based clothes iron. This added time and faced numerous challenges to deliver clothes. However, with electricity access from the mini grid, she now uses an electric iron which is a lot easier and saves a lot time on her tailoring business.

She earns and manages her income for household expenses independently. She spends NPR 1500 for son's school fee, deposits NPR 1,000 in each of the 7 different saving groups that she is a member of, NPR 500 and NPR 100 in three monthly saving groups each. Besides this, she also manages NPR 5,000 as household expenses. Before the tailoring, she depended on her husband for money and household expenses. She also had a bitter experience that when she was unemployed, no one listened to her or supported in case of financial emergencies.

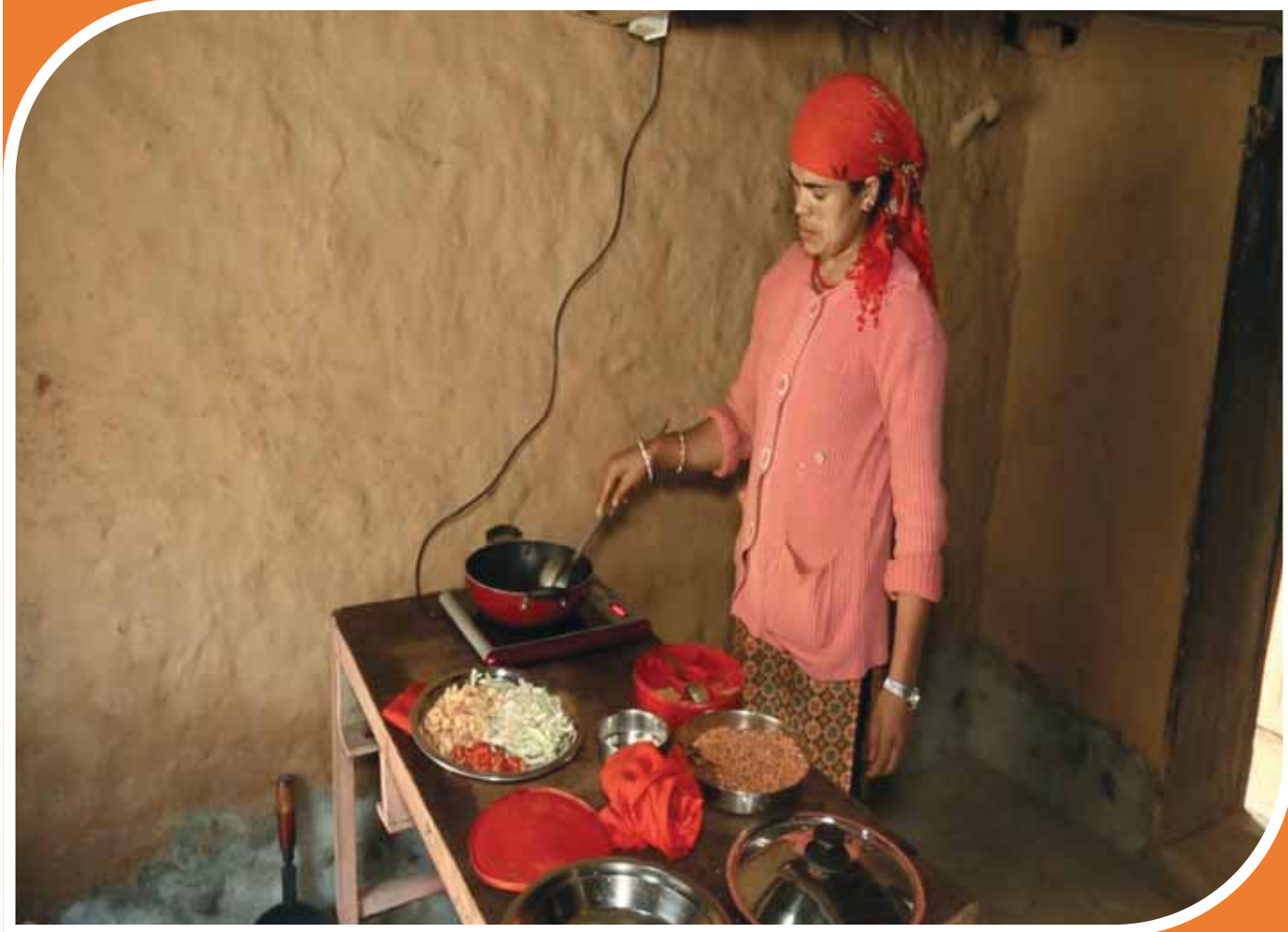
Now, as she earns her own income, she takes decision on household expenses by herself. She has now been able to teach her son at a boarding school. She is also a member of the Executive Committee of Chaukune Solar Electricity Users' Cooperative Limited. After earning her own income, she says she feels a lot more confident and empowered. She now has plans to purchase an electric tailoring machine to run the business with quality. She says she is tired of manual sewing machine because of health issues related with the past working habits.

Dharan Municipal Waste to Energy Project

The objective of the project was to use organic source from MSW as energy source through Anaerobic Digestion, for which an estimated plant of 30 tons per day of organic MSW at Panmara, Ward No. 6, Dharan Sub-metropolitan, Sunsari District of Koshi Zone in Eastern Development Region of Nepal has been built.

Waste management is the primary area of concern for municipal bodies. Wastewater and Solid wastes contain both organic and inorganic wastes. These effluents when discharged or land filled without adequate treatment shall have an adverse effect on human health, hamper agricultural production and also pose serious threat to marine & wildlife. After a herculean effort, the first Municipal Solid Waste management sub-project under Scaling Up Renewable Energy Program-Extended Biogas Project has been developed by Dharan Sub-Metropolitan City. The sub-project has been developed by Venture Waste 2 Energy, which is committed to sustainable growth in renewable energy sector. The sub-project has been supported by Alternative Energy Promotion Centre (AEPC) and funded jointly by Government of Nepal and the World Bank (WB).

The motive of this project is to produce renewable energy from waste. Municipal waste is collected and segregated at site in Panmara, Dharan. The segregated organic fraction is converted into biogas using MIBR (microbe induced batch reactor) technology. The produced biogas is further upgraded into natural gas quality. Pressure swing adsorption system (PSA) is used to produce bio-natural gas. The upgraded natural gas is further compressed up to 200 bars and stored in high pressure cylinders. These cylinders shall then be hauled using cascades into a daughter station which shall be placed in petrol stations. This gas shall be used for automotive purposes to drive bio-CNG vehicles. Similarly the plant produces approximately 6.5 tons of organic fertilizers daily, which is sold in the local market. This project not only manages waste of the city, but also produces energy from it, which would otherwise be dumped into landfills creating odor and greenhouse gases. This project is not only producing energy and fertilizer, but also treating waste water with state of the art waste water treatment system. It is also providing job opportunities for waste workers and has created a new niche market for biogas, thereby substituting the import of fossil fuels to some extent.



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 interconnection 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 organized effort is being made for demand creation. Significant financial barriers persist, and the transition to a market-enabled or credit-based model has been slow. Furthermore, the renewable energy 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 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 the Ministry. Lack of own building and land is also a key challenge for AEPC which is 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 development partner 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-positioning AEPC and its functions in new federal context
- Transforming AEPC towards national and regional 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 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, opportunities prevail; 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 interconnection of RETs.
- 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 interconnection 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 galvanize 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 in 2019/20 for the programs/activities (AEPC Core Activities)

SN	Activity/Program	Unit	2019/20		
			Target	Achievement	% Achievement
1	Data logger installation for mapping wind energy feasibility	No.	3	0	-
2	Workshops and Seminar on RETs	No.	7	6	86%
3	Awareness Programme on Renewable Energy	No.	7	7	100%
4	Installation of gasifier supporting enterprises on agro-daiiry and lokta paper processing	No.	30	33	110%
5	Development of strategies and capacity development promotion, planning, development, implementation and monitoring of renewable energy technologies for community level enterprise operation	No.	30	8	27%
6	Capacity development of local and provincial level on renewable energy	No.	14	11	79%
7	Detail Feasibility Study of Wind Energy Project	No.	10	-	-
8	Feasibility Study of Large Biogas Plants	No.	50	10	20%
9	Detail feasibility studies of micro and mini hydro projects	No.	12	5	42%
10	Feasibility studies on installation of bio energy based gasifier thermal systems	No.	15	3	20%
11	Feasibility study of geo-thermal and hot spring	No.	1	1	100%
12	Awareness on energy efficiency with SMS alert, radio and television	No.	10	3	30%
13	Activities implementation of National Energy Efficiency Strategy	No.	21	8	38%
14	Energy Audit of high energy consuming commercial/industrial entity and application of energy efficient measure	No.	5	2	40%
15	Implementation of energy efficiency program related net zero carbon building, diesel pump replacement	No.	10	0	-
16	Mini/Micro hydro connected to the national grid	No.	3	1	33%

SN	Activity/Program	Unit	2019/20		
			Target	Achievement	% Achievement
17	Activities implemented by renewable energy units at provincial levels	No.	2	2	100%
18	Support in the development of provincial and local level energy plans	No	10	2	20%
19	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.	4000	2990	75%
20	Installation of household biogas plants for target groups comprising of dalits, endangered, indigenous and tribal communities	No.	2500	57	2%
21	Installation of solar pumping system for irrigation for commercial agriculture	No.	500	525	105%
22	Smoke free homes programme: Distribution of portable metallic cookstoves to households belonging target groups including dalits, tribal and backward classes.	No.	10000	10465	105%
23	Installation of solar street lights in accident prone turns and public places of areas without access to electricity	No.	5000	0	-
24	Installation of institutional solar energy technologies at rural municipality offices, and ward offices,	No.	100	69	69%
25	Solar energy assisted oxygen concentrator at tourist destination	No.	40	0	-
26	Additional subsidy for incomplete sick micro hydro projects	No.	20	0	-
27	Productive energy use for small and cottage industries operated by target groups including dalits, tribal and indigenous groups.	No.	40	0	-
28	Clean Energy Program: Installation of solar energy systems for target groups including dalits, tribal and indigenous	No.	10000	9397	94%
29	Installation of solar mini grid for community electrification	kW	260	0	-
30	Clean cooking solutions for the 22 districts of the Terai Region.	No.	35000	0	-
31	Solar Mini grid for Mountainous and Upper Hills	No.	2	2	100%

Annex-2: Progress achieved in 2019/20 for the programs/activities (NRREP)

SN	Activity/Program	Unit	2019/20		
			Target	Achievement	% Achievement
1	Mini/Micro hydro installation support to electrification	kW	2000	870	44%
2	Metallic Improved Cookstove Installation benefitting family health	No	10000	5818	58%
3	Access to clean energy with Household Biogas Installation	No	5000	1766	35%
4	Solar water Pumping for Irrigation and Drinking water	No	100	0	-
5	Institutional Solar Photovoltaic System for various institutions	No	500	134	27%
6	Access to clean energy with Community and Institutional Biogas Plant Installation	No.	120	23	19%
7	Increase in employment and commercial activities with Productive Energy use Promotion	No.	250	96	38%
8	Solar Mini grid installation for electrification	kW	600	50	8%
9	Access to clean energy with urban and commercial biogas plant	No.	100	28	28%
10.	Rehabilitation of earthquake affected biogas plants	No.	3000	0	-
11.	Rehabilitation activity for earthquake affected MHPs	kW	200	112	56%
12.	Loan mobilization of RET through CREF	No.	27	7	29%
13.	Capacity development CREF	No.	9	3	33%
14.	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on community electrification	No.	10	9	90%
15.	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on solar	No.	20	15	75%
16.	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on bioenergy	No.	20	14	70%
17.	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on biogas	No.	40	30	76%
18.	GESI related activities	No.	15	4	27%

SN	Activity/Program	Unit	2019/20		
			Target	Achievement	% Achievement
19.	Carbon and climate change related activities	No.	15	10	67%
20.	Green Climate Fund related activities	No.	20	11	55%
21.	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on productive energy use	No.	20	10	50%
22.	SASEC related activities	%	20	18	90%
23.	NRREP Management Expenses	%	50	50	100%
24.	Capacity building on various stakeholders on renewable energy	No.	20	20	100%
25.	Nepal Mini Grid Program related activities	No.	25	17	70%
26.	NRREP related activities	%	20	7	35%
27.	Electrification through megawatt scale wind farm in public private partnership	No.	2000	0	-
28.	Solar rooftop program for residential, commercial and industrial sector	kW	425	500	118%
29.	ESS and compliance related activities	No.	12	5	42%
30.	Soft loan and interest subsidy for the connection of solar in to the national grid	kW	1000	3256	326%
31.	Implementation of renewable energy program through reverse auction, demand aggregation, new innovative business models	No	18	0	-
32.	Electrification through solar home system in Province 2 , Karnali Province and Sudoor Paschim Province	No.	20000	10682	53%

Annex-3: Progress achieved in 2020/21 for the programs/activities (AEPC Core Activities)

SN	Activity/Program	Unit	2020/21		
			Target	Achievement	% Achievement
1	Detailed Feasibility study of Minigrid	No.	50	29	58%
2	Capacity building activities on renewable energy	No.	5	4	80%
3	Awareness program on renewable energy related activities	No.	5	2	40%
4	Publications related to renewable energy	No.	100	90	90%
5	Program implementation units at Province 1 and 7	No.	2	2	100%
6	Technical support to provincial and local level with support on outreach	No.	10	8	80%
7	Orientation and capacity building on renewable technologies to Province Level	No.	7	5	71%
8	Implementation of energy efficiency program at federal, provincial and local level	No.	15	12	80%
9	Technical standards of five electrical appliances. Preparation of baseline and benchmark	No.	5	5	100%
10	Energy consumption assessment of industries, hospitals, commercial and public buildings	No.	2	2	100%
11	Energy efficiency and energy audit	No.	6	6	100%
12	Feasibilities and studies on productive end use of renewable energy	No.	20	0	-
13	Outreach and subsidy processing	No.	6	5	83%
14	Solar pump for irrigation	No.	500	524	105%
15	Eight incomplete and sick micro hydro completed and rehabilitated	No.	15	6	40%
16	Large biogas constructed under cooperative model	No.	3	1	33%
17	Installation of two/three pot holes improved cooking stoves at mountainous and upper hilly region	No.	2800	2800	100%
18	Clean energy program: replacement of dung cakes and agricultural residue for cooking	No.	15000	19898	133%
19	Solar home system for areas without access to electricity	No.	5000	6013	120%
20	Electricity generation from minigrid project (Multi year program)	kW	1000	521	52%

Annex-4: Progress achieved in 2020/21 for the programs/activities (NRREP)

SN	Activity/Program	Unit	2020/21		
			Target	Achievement	% Achievement
1	Access to clean energy with Household Biogas Installation	No.	10000	5641	56%
2	Solar water Pumping for Irrigation and Drinking water	No	50	33	66%
3	Institutional Solar Photovoltaic System for various institutions	No	1000	598	60%
4	Community and Institutional Biogas Plant Installation	No	30	12	40%
5	Productive Energy Use	No	50	81	162%
6	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on community electrification	No.	10	8	80%
7	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on solar	No.	25	22	88%
8	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on bio energy	No.	10	8	80%
9	Feasibility study, survey, design, supervision, quality assurance, training and capacity development on biogas	No.	15	14	93%
10.	GESI related activities	No.	6	6	100%
11.	Carbon and climate change related activities	No.	10	9	90%
12.	GCF related activities	No.	5	4	80%
13.	SASEC	%	10	8	80%
14.	NRREP Management Expenditure	%	25	22	88%
15.	Nepal Mini-grid related activities	%	25	22	88%
16.	NRREP related activities	%	8	8	100%
17	Tier 3 improved cookstoves and rocket stove installation at institutional and household level.	No.	11000	5668	52%
18	Solar home system for un-electrified areas	No.	25000	22190	89%

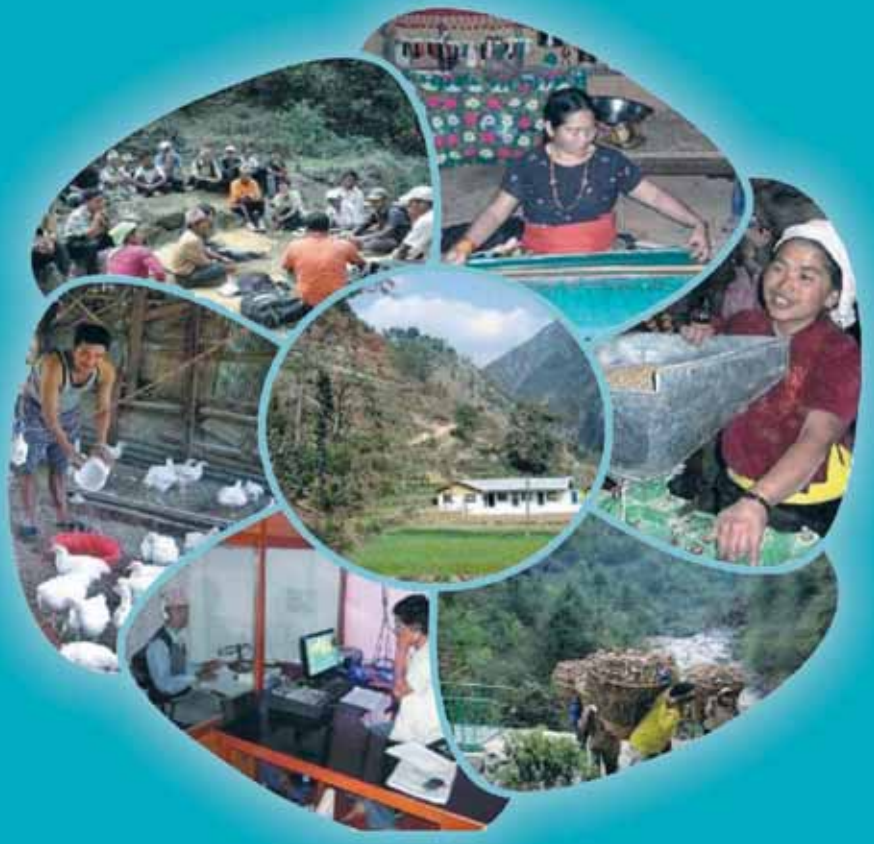
SN	Activity/Program	Unit	2020/21		
			Target	Achievement	% Achievement
19	Solar cooker and dryer installation	No	120	7	6%
20	Nepal Mini grid related solar/bio mini and micro hydro development grant and loan	kW	1000	0	-
21	Challenge Fund for promotion of RETs	No.	10	0	-
22	Pico/Mini/Micro Hydro	kW	1500	1116	74%
23	Installation of Improved Water Mills	No.	175	4	2%
24	Rehabilitation of earthquake affected biogas plants registered under the CDM project	No.	5000	6513	130%
25	Waste to Energy and commercial biogas plant	No	80	28	35%
26	Compliance related activities	No.	6	5	83%
27	Power output verification and testing, impact evaluation of RETs	No.	12	12	100%
28	Environment and social safeguard	No.	8	6	75%

Rt. Hon'ble Speaker Agni Prasad Sapkota distributing solar home system to landslide victims of Jugal Rural Municipality, Sindhupalchowk

Hon'ble Minister Pampha Bhusal with officials and stakeholders observing commercial biogas plant in Pokhara

Solar panel, inverter, battery and mounting structure support to flood and landslide affected Manang District

AEPC receiving Project Team for 2019 Award in Environmental and Social Safeguard Monitoring for SASEC Project



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