

A

REPORT

ON

Conduct Feasibility Study of Energy Hubs for AEPC/NRREP

SUBMITTED TO

**ALTERNATIVE ENERGY PROMOTION CENTRE (AEPC)
NATIONAL RURAL AND RENEWABLE ENERGY PROGRAMME (NRREP)
KHUMALTAR, LALITPUR, NEPAL**

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LIST OF ABBREVIATIONS

AEPC	Alternative Energy Promotion Center
IAP	Indoor Air Pollution
CREF	Central Renewable Energy Fund
DDC	District Development Committee
DFS	Detail Feasibility Study
DSC	District Service Center
GESI	Gender Equality and Social Inclusion
GO	Government Organization
I/NGO	International/ Non Government Organization
ICS	Improved Cook Stove
ISPS	Institutional Solar Photovoltaic System
MCPL	Multiscope Consultancy Private Limited
MIS	Management Information System
NRREP	National Rural and Renewable Energy Programme
NSP	National Service Provider
PEU	Productive Energy Use
PPP	Public Private Partnership
PQ	Pre-Qualified
PVPS	Photovoltaic Pumping System
RE	Renewable Energy
REF	Renewable Energy Fund
RET	Renewable Energy Technology
SHS	Solar Home System
SSHS	Small Solar Home System
SWOT	Strength Weakness Opportunity and Threat
TRC	Technical Review Committee
VDC	Village Development Committee

1. BACKGROUND OF STUDY

AEPC/NRREP as a the focal agency for promoting renewable energy technologies in the country has been working with various partners at national, regional and local level to increase outreach. This includes District Environment, Energy and climate Change Sections (DEECCSs)/ DDC in 75 districts, 2 National Technical Service Providers (NSPs), 9 Regional Service Centers (RSCs) and various pre-qualified private companies. The government of Nepal has been making commitment towards renewable energy in an increasing trend with the support from major development partners. In February of 2012, the Prime Minister of Nepal has made commitment to provide Clean Cooking Solution for all by 2017. This commitment would mean that the renewable energy sector in Nepal needs to explore new and innovative as well as alternative approaches to promote access to energy for all. Besides commitment to NRREP which is about USD 184 million over five years, Governments of Germany, Norway as well as bilateral organizations like UNDP, ADB, WB are designing interventions related to renewable energy to support government to increase access to renewable energy in Nepal. Similarly, Government of Nepal has recently formally announced formation of Environment Friendly Local Government framework which provides guidance to all Local Bodies in Nepal to promote, among other things, clean and renewable energy services in their constituencies. In line with the framework, the Government of Nepal also has announced formalization of the District Environment, Energy and Climate Change Section in all the 75 districts in Nepal. The DDCs, which are apex government organization at the local level, have been increasingly allocating substantial resources to promotion of renewable energy services in Nepal.

While the focus on increasing (renewable) energy access has been significantly felt at national level, programme has identified significant lack of adequacy of the level of support and services received by the remote Nepali citizens, specially the women, poor and marginalized communities. One of the principal complaints has been on centralized decision making and lack of localization and awareness of local context to deliver effective services. After a year of experience in implementation of NRREP it is realized that there is need of penetration in for coordinated RE promotion at national, sub-national and district level. Together with this realization, the programme also realized that there is a presence of AEPC at the region/ sub nation to deligate the authority to some extent whereby delayed due to centralized system. Realizing the need to establish sub-national presence, AEPC board has made a principal decision to establish branch offices working as regional energy hubs.

In light of the developments, there is a need for systematic analysis of the level of services received by the community as well as decision making processes in relation to technical review of projects and disbursement of subsidy. Through this analysis the feasibility of establishing sub-national level offices for AEPC/NRREP also needs to be studied and validated. On this background MCPL is going to **conduct feasibility Study of energy hubs for AEPC/NRREP.**

2. OBJECTIVES

The objective of this assignment is to review existing modality of technical review of projects and subsidy disbursement decision, as well as ability to solicit interests, complaints and issues of the beneficiaries; with intent of understanding the feasibility of 'Energy Hubs' as sub-national presence of AEPC.

3. SCOPES OF WORK

The scope of work shall include the following:

- Study existing mechanism for subsidy processing and administration as well as technical review of projects from beneficiary's perspective.
- Conduct focused group discussions (at least two in rural areas) with potential and existing beneficiaries on claim making capability and effective ways for community to articulate demand and grievances to AEPC with respect to renewable energy.
- Conduct meeting at AEPC with senior level staff to get depth understanding
- Identify gaps in existing RE service delivery modality including identifying opportunities for improving them.
- Among identified gaps and processes, recommend list of activities that can be conducted by AEPC branch offices: energy hubs.
- Calculate costs of establishing energy hubs including setup, HR costs and tentative activities costs.
- Conduct a half day meeting at AEPC with senior staff and share draft report and incorporate feedback accordingly.

4. OUTPUT/DELIVERABLES

Following are the expected output from the assigned task

- Inception report with methodologies to carry out the assignment
- Conclusion on whether hubs are feasible or not
- Role of hub and its value addition
- Financial calculations of establishing and operating energy hubs

5. METHODOLOGY APPROACH

The following steps have been adopted to review existing modality of AEPC along with feasibility study of Energy Hub in the flow chart as below

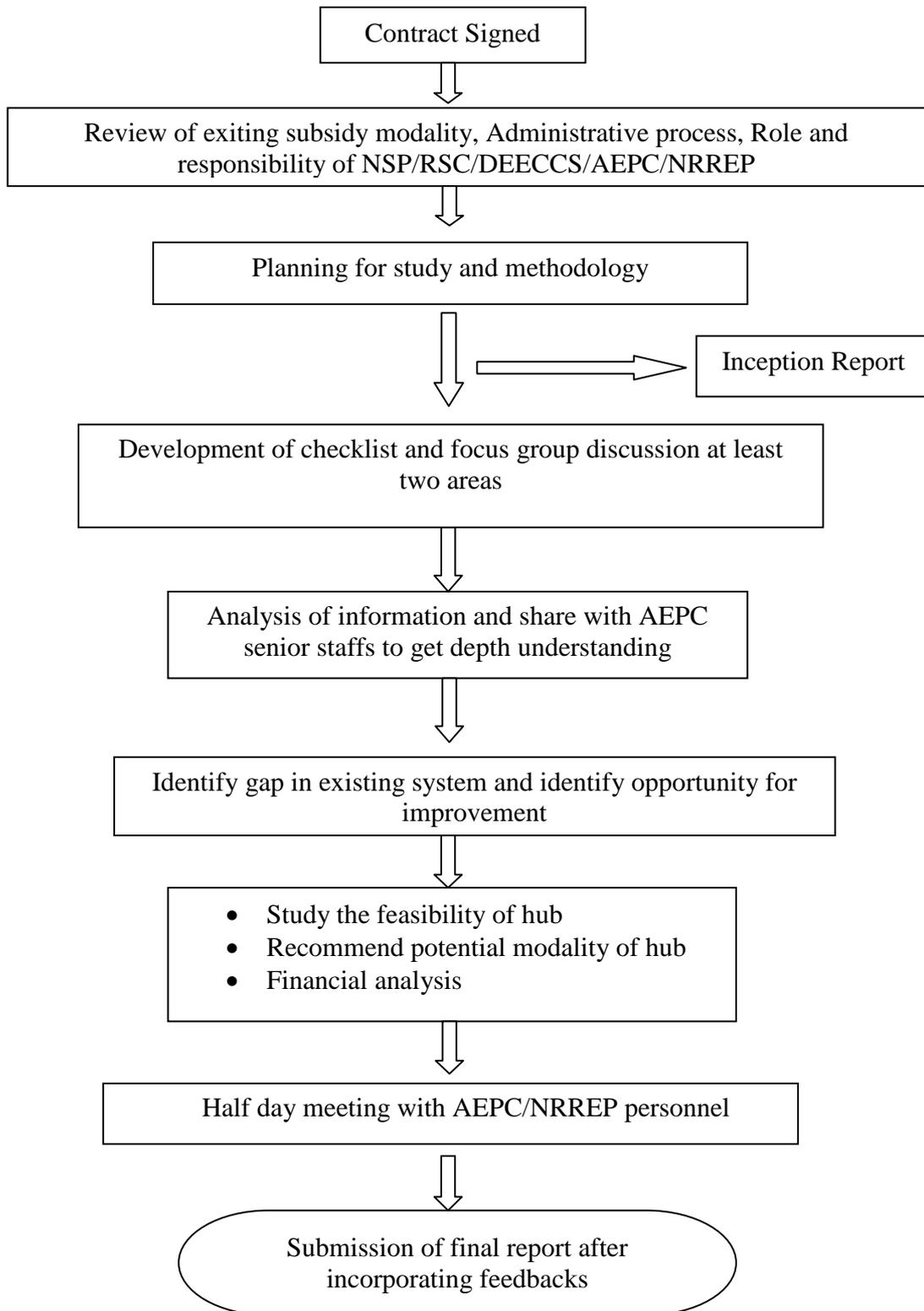
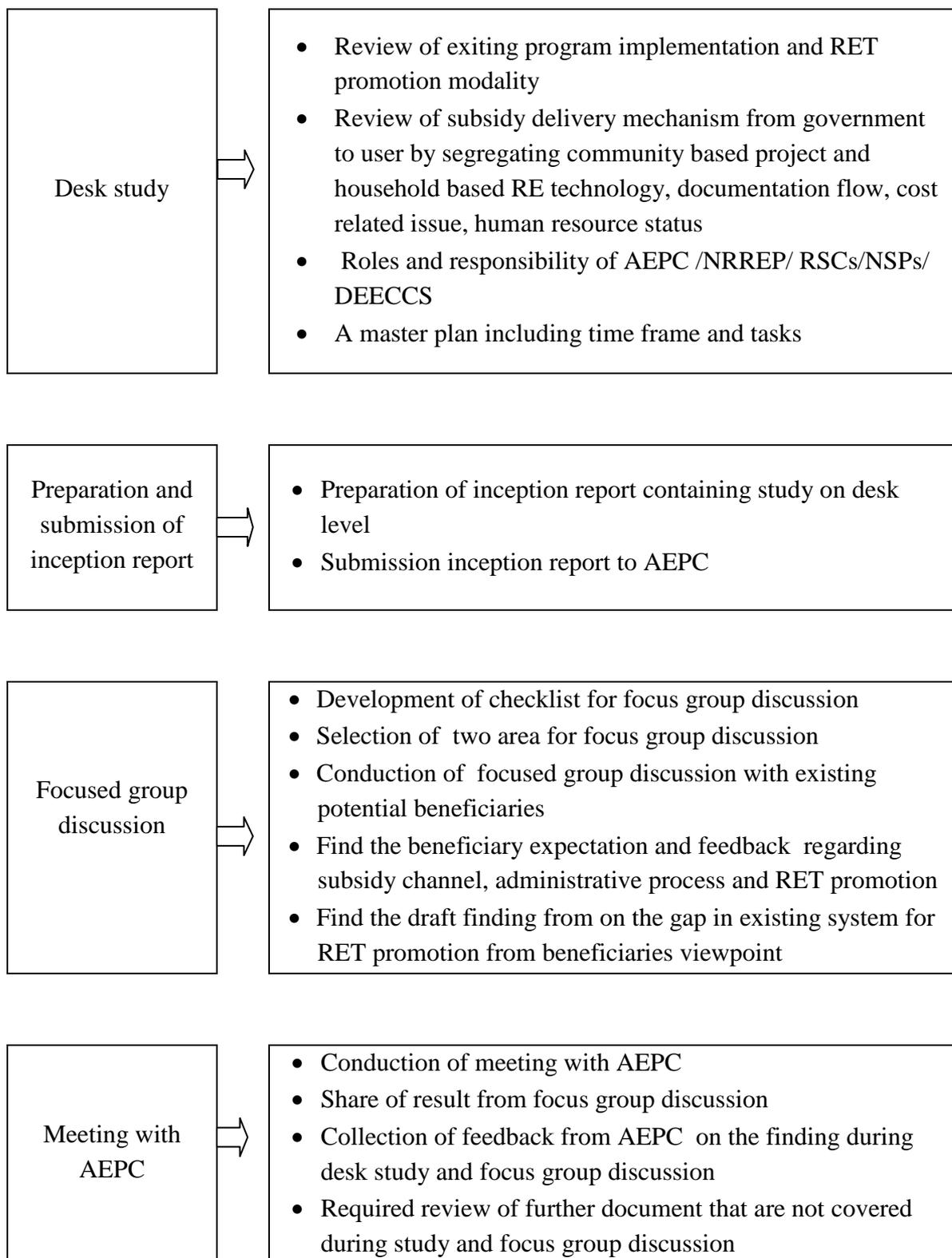
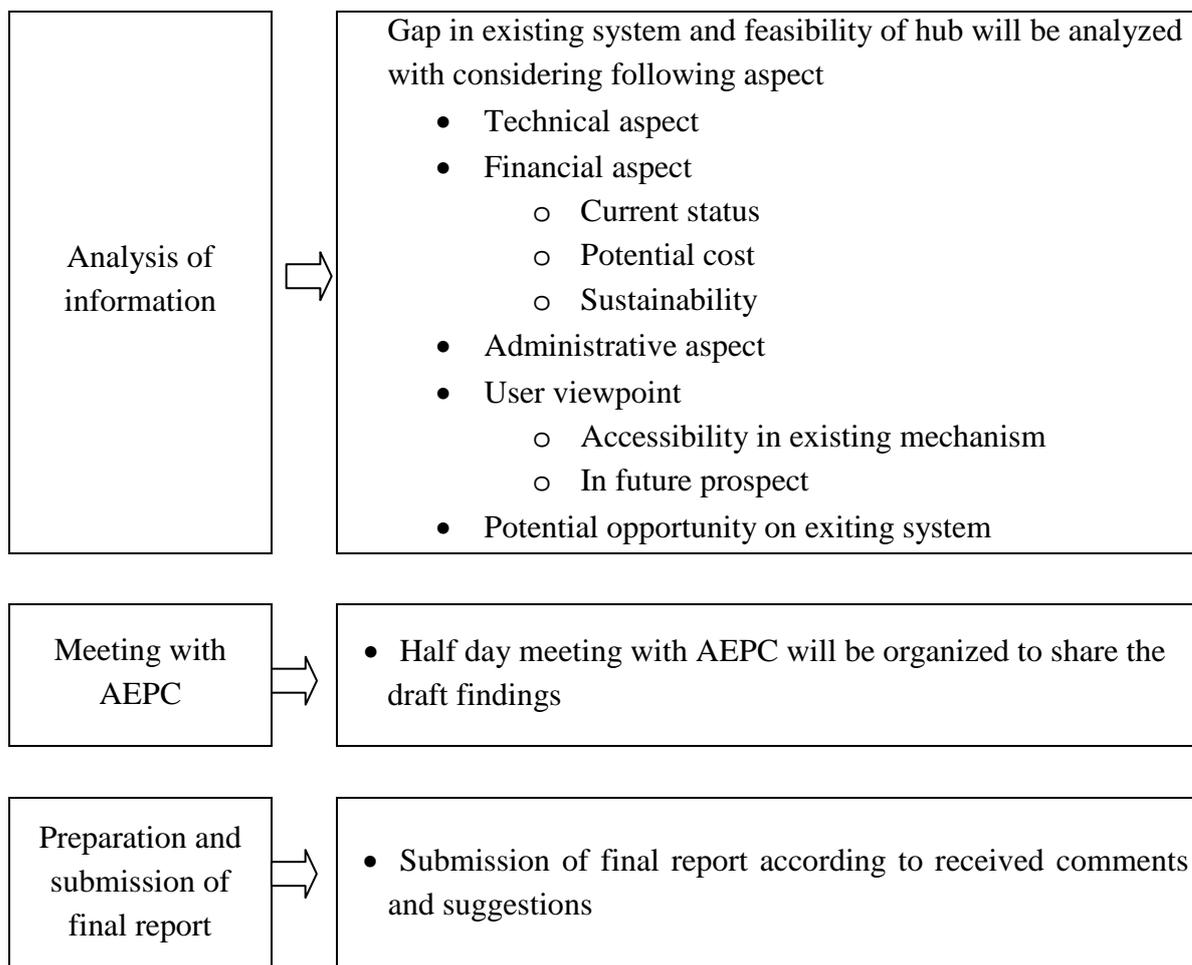


Figure 1: Methodological approach

Detail descriptions are given in the following steps





7. Existing Scenario

The existing program implementation and RET promotion modality of AEPC/NRREP from beneficiaries' perspectives has been done in this section. AEPC works collaborating with the various partners like ministries and its departments, non-governmental bodies, private sector, civil society and community/users groups for the development and promotion of RETs in the country.

There are three main components under which various sub-components works,

- **Central Renewable Energy Fund (CREF) component**- This component is the core financial institution responsible for efficient subsidy delivery and credit support to renewable energy sector.
- **Technical Support Component (TSF)** – In order to accelerate renewable energy service delivery with better quality, this component is supported by various subcomponents including Solar, Biomass, Community Electrification, Carbon and Climate, Monitoring and Quality Assurance, Institutional Development, Gender Equity and Social Inclusion and Local Body Coordination and Outreach.
- **Business Development for Renewable Energy and Productive Energy Use Component** – This component is contributing to enhance income and employment generation potential for micro, small and medium sized enterprises in rural areas.

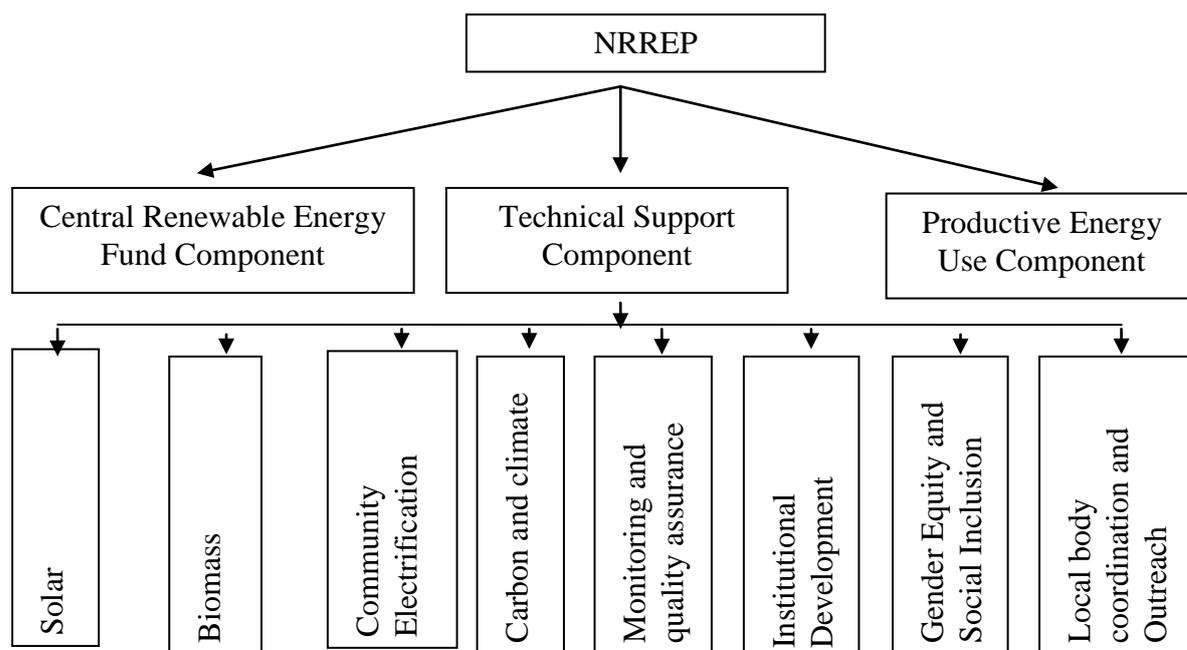


Figure 2: Program Components Structure

Existing service providers

AEPC/NREEP is the centre body to look after all these nine Regional Service Centers, two National Service Providers with professional competence to work as intermediary organizations between AEPC and rural households/communities for RE programs and 75 DEECCU in all districts in cooperation with DDCs. Existing nine Regional Service Centers are facilitator for any regional (covering certain districts) regarding AEPC subsidies, programs, monitoring etc. DEECCS in all districts work in cooperation with DDC for providing facilities for different private companies of those regions, subsidy delivery, bridge with center AEPC etc. for running of different programs. All the financial control and staffs recruitment are from center body with regional and district units' feedbacks.

RSCs to be as GESI-based community mobilization works, generating peoples' demands for RETs, develop RET-based projects, supervise construction/installation works, provide post-construction support to households/communities and coordinate with respective DEECCSs for all RE programmes in the district.

AEPC ensures outreach through engagement of local bodies, sub-national and national service providers and private sector. Capacity development of local government bodies has been emphasized through engagement of DDCs in all the 75 districts of the country for demand collection, coordination, implementation, monitoring and supervision of RETs and programs, with complimenting support from Regional Service Centers across

Nepal. Pre-qualified (PQ) companies are involved in the manufacturing, supply, installation and after sales services.

AEPC/NRREP will provide technical support to DDCs in the form of budget, knowledge and materials for the implementation of activities through DDC/DEECCSs and DSCs. This technical support will be as per contract between AEPC and DDC. Since support from AEPC alone would not be sufficient to achieve desired outputs on time, it is expected that DDC will mobilize additional resources from DDC budget or facilitate contribution from other stakeholders to fill the resource gaps.

Below figure describe the gap in present approach for Public Private Partnership model

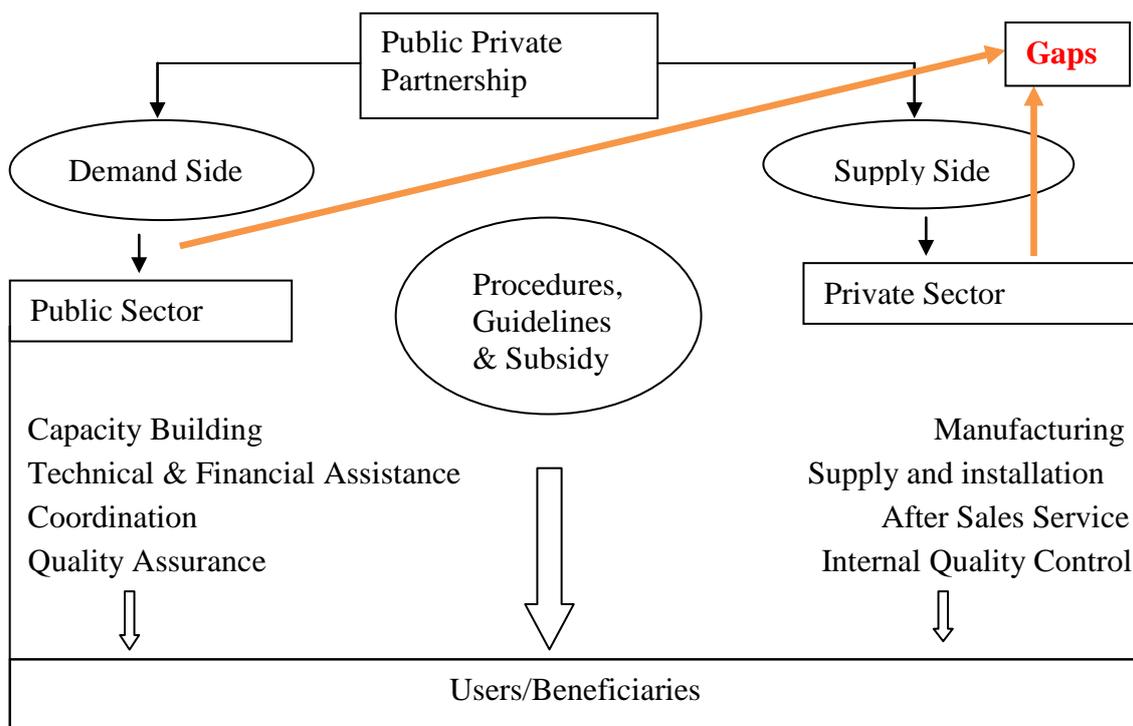


Figure 3: Public Private Partnership Approach

AEPC follows Public Private Partnership Model and Demand Based Approach. Public Sector works for the capacity building, technical and financial assistance coordination, quality assurance etc. and private sector works for manufacturing, supply and installation and after sales services. The main gap in present approach is found in these two sector works which are mention in term of SWOT analysis below for each component following this works.

Study of previous decentralized mechanism practice

Previous decentralized practice of AEPC has been studied, and found that two branch offices had been established in Biratnagar and Nepalgunj. But unfortunately both of them had been closed. The reasons behind the unsuccessful were lack of well defined process including power delegation and proper roles and responsibilities. The lesson learnt is that it is needed to emphasize on proper processes as well as well-defined roles,

responsibilities and authorities along with well decentralized structures. It can be concluded that the Energy Hub will be successful structure to accelerate RE service delivery in Nepal if the processes become users' friendly. It is needed to bring in practice online and paperless mechanism. In addition, there is no doubt to avoid lengthy processes and demand of unnecessary documents.

8. Focus group discussions

Focused group discussions have been conducted to solicit interest, complaints and issues of beneficiaries. The discussions with potential and existing beneficiaries on claim making capability and effective ways for community to articulate demand and grievances to AEPC with respect to renewable energy has been followed by discussions that have been performed in Damauli, Tanahun and Buddhanagar, Kathmandu on 8 and 11 Bhadra 2071 respectively. The participants were mainly from RSC, DEECCS, private companies, user groups and other experts. Outcomes of the focus group discussions are listed below:

Process

- Most of the processes are centralized and therefore decentralization needs to be emphasized by empowering RSC, DEECCS, and private companies in order to provide efficient services to users.
- Processing is slow, so there must be online submission of documents. In addition, approval of projects should be based on online documentation and submitted hardcopy documents at DEECCS.
- It is necessary to make submission of document by online as well as hard copy.
- Time of every step should be pre defined and status of the proposal can be check through online system.
- Clear relation between RE stakeholders such as AEPC, RSC, DEECCS and PQ companies must be established.
- The subsidy mechanism is slow and there is also administrative hassle for subsidy delivery.

Structure

- Decentralized system is necessary at the remote area as well as non-accessible regions.
- Repeatedly followed to center for processing and correction of documents.
- Through Energy Hubs with well defined roles, responsibilities and authorities may easily link center to DEECCS and other stakeholders.
- Prefeasibility study report should be done in district level and capability development training should be organized if required.
- There is different service delivery mechanism for each component which needs to be harmonized. One energy information unit is needed to provide information for all the components.

- It is required to increase implementing partners at district level.

9. Identification of gaps

In order to identify the gaps in RE service delivery modality, we have done SWOT analysis of different components of AEPC/NRREP and service providers including RSC, DEECCS and their linkage with AEPC.

9.1 Productive Energy Use

Main objective of this component is to contribute to increase income and employment generation potential for micro, small and medium sized enterprises in rural areas, particularly for men and women belonging to socially and economically disadvantaged groups. Working modality for the promotion of RE based enterprise is as follows

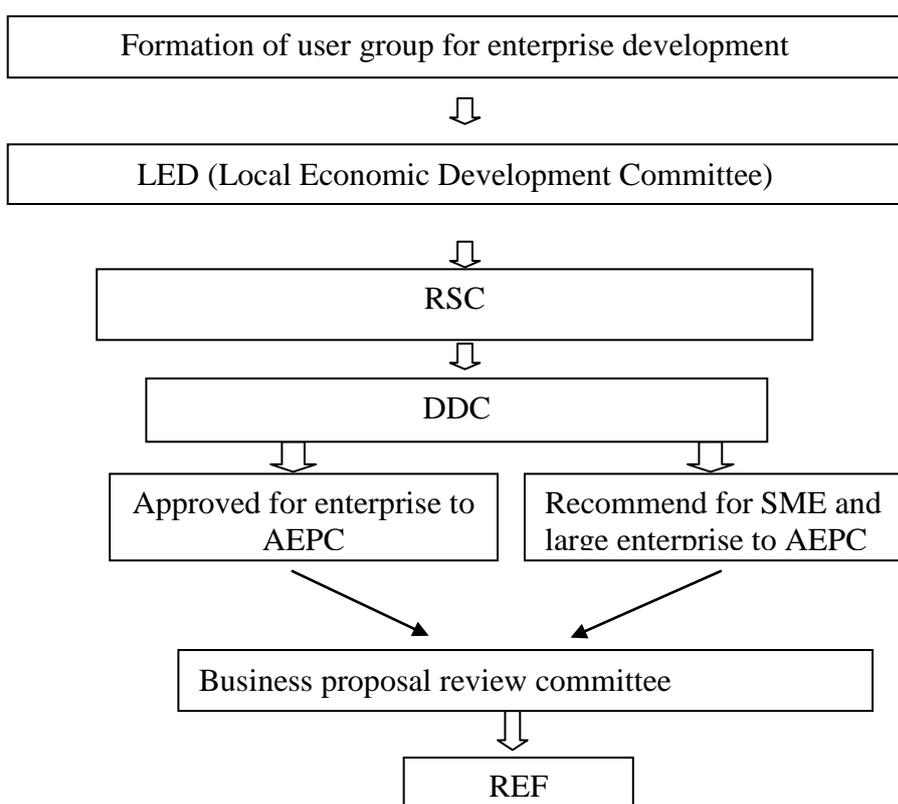


Figure 4: Working modality for the promotion of RE based enterprise

The SWOT analysis of PEU unit is presented table below

Table 1: SWOT analysis of PEU sub component

Strength	Weakness
<ul style="list-style-type: none"> • Contribute to increase income and employment generation potential for RETs in rural areas • Channelized mechanism for Public Private Partnership (PPP) model 	<ul style="list-style-type: none"> • Many layers, more paper works and time consuming • Little money/subsidy/loan, which is just sufficient for tiny scale of business • No clear identification of markets • DEECCS are monitoring some of the RETs in district level, it is noted that there is lack of implementation of their recommendation
Opportunities	Threat
<ul style="list-style-type: none"> • Enhance skill/knowledge/ awareness for RET based enterprise creation and development • Increasing market demand for RET service for enterprise establishment. • Provides opportunities for needy people at local level for income generating activities • Possibility to tap local resources for RET based activities 	<ul style="list-style-type: none"> • It is challenging to increase people's participation due to not easy access, slow administrative process and service lengthy mechanism

In overall productive end use has the potential for job creation, increase in entrepreneurship and addressing of demand at local level but lack of coordination in local and regional level can make the process more lengthily and slow.

9.2 Wind

Installation of few small sized wind energy plants and data base collection work has been started by AEPC. AEPC has started to formulate the guidelines for Pre-Qualification of wind turbine under subsidy policy, development of Database Management System for Wind Data and data collection work. Working modality for the promotion of wind energy is as follows

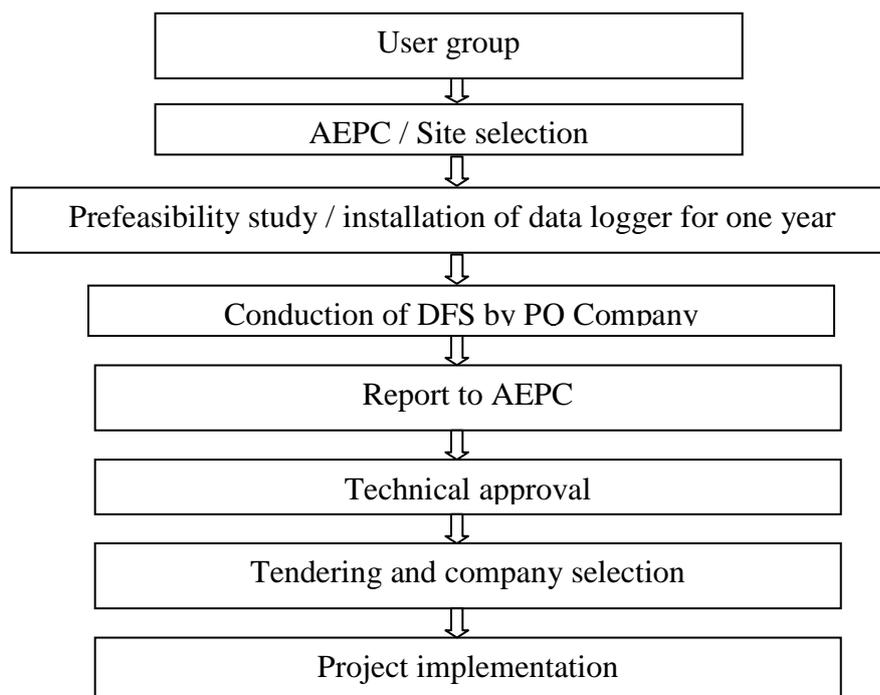


Figure 5: Working modality for the promotion of wind energy

Table 2: SWOT analysis of wind energy component

Strength	Weakness
<ul style="list-style-type: none"> Promoting wind energy in Nepal Detail technical study regarding wind assessments 	<ul style="list-style-type: none"> Long time for data collection no data available in potential area Lack of expertise at local level
Opportunities	Threat
<ul style="list-style-type: none"> Provides opportunities for needy people at local level Local mobilization of resources 	<ul style="list-style-type: none"> Lack of coordination between local bodies and local people

Such types of component can strengthen the capacity of local level and mobilized the local resources but implementation unit has the difficulties due to lack of expertise and manpower at local and regional level.

9.3 Biogas

The Government of Nepal (GoN) and External Development Partners Supporting Nepal's Rural and Renewable Energy Sector have design National Rural and Renewable Energy Programme (NRREP) to be implemented by AEPC for five years mid- July 2012 to mid-July 2017 in a single programme modality. The biogas energy sub-component of NRREP covers biogas (household, intuitional, community and large sized) technologies (BTs). Existing working modality for the promotion of household biogas are as follows

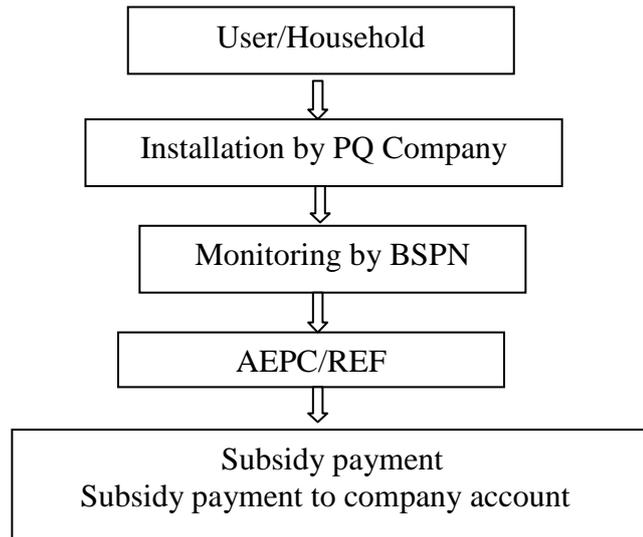


Figure 6: Existing working modality for the promotion of household biogas

Existing working modality for the promotion of large biogas plant are as follows

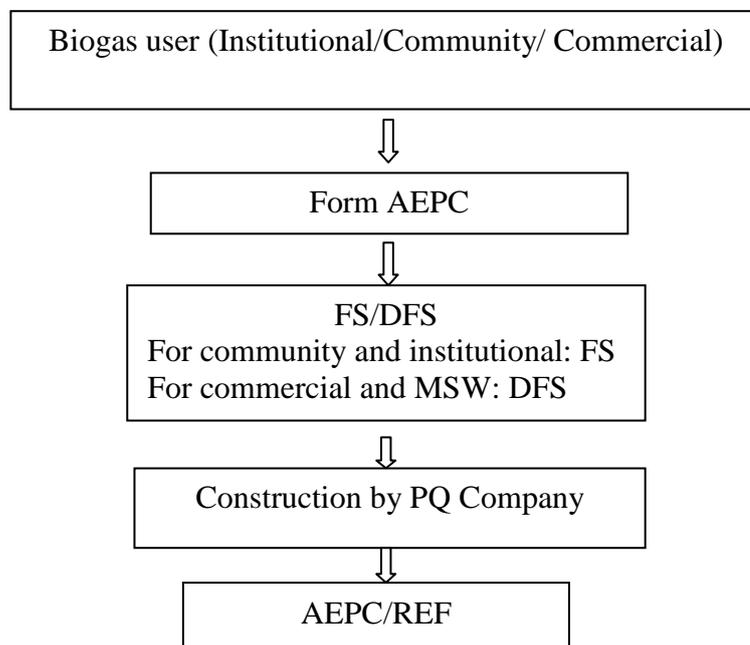


Figure 7: Existing working modality for the promotion of large biogas

The SWOT analysis of biogas sub component is explored in table below

Table 3: SWOT analysis of biogas sub component

Strength	Weakness
<ul style="list-style-type: none"> • Energy access with waste management mechanism • Output oriented service regarding cooking end use • Easy access between company and user 	<ul style="list-style-type: none"> • Focus of the company around their comfort area and where there is additional subsidy • Absence of companies to District level linkage make weak feedback mechanism
Opportunities	Threat
<ul style="list-style-type: none"> • PQ companies are working for demand generation • Growing demand for biogas market. • Users can select the reliable PQ company based on their performance 	<ul style="list-style-type: none"> • No long term policy for subsidy • Sometime mutual collaboration for false work between company and users

Local demand creation of biogas plant manufacturing and local mobilization of wastes are the major task and strength of this component with some difficulties in subsidy delivery mechanism and community based demand creation.

9.4 Solar

AEPC, through its solar energy unit support dissemination of solar energy systems through national coordination of solar sector activities. AEPC has been largely successful towards meeting its objectives of promoting Solar Home System (SHS) with emphasis on quality and availability of credit as a mean for rural electrification which has proven to be the only feasible way to provide electricity in many rural areas.

AEPC mainly works in PPP modality approach for the installation and after sale service of solar systems. AEPC qualifies the companies/vendor for the solar system installation and these are the numbers of Pre-Qualified (PQ) companies for the installation of different solar systems. Existing working modality of SHS greater than 20 Wp

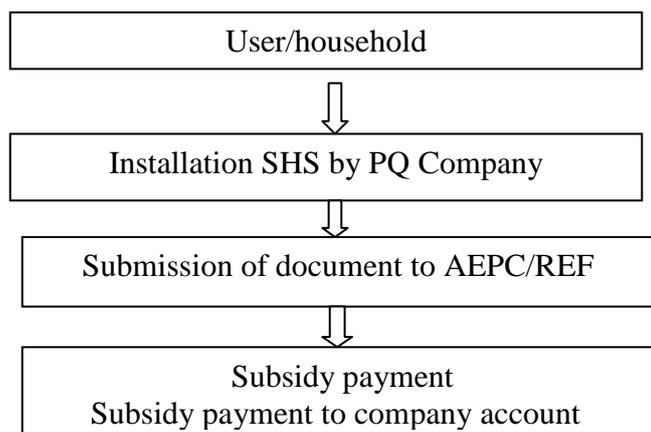


Figure 8: Existing working modality of SHS

Existing working modality of SSHS less than 20 Wp

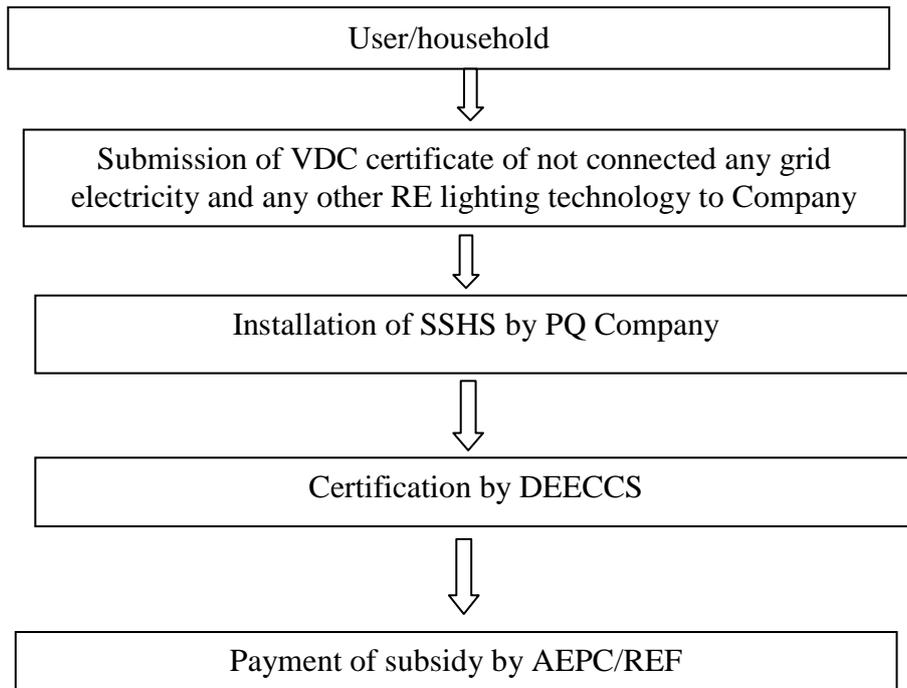


Figure 9: Existing working modality of SSHS

Existing working modality for the promotion of Institutional Solar Photovoltaic System (ISPS)

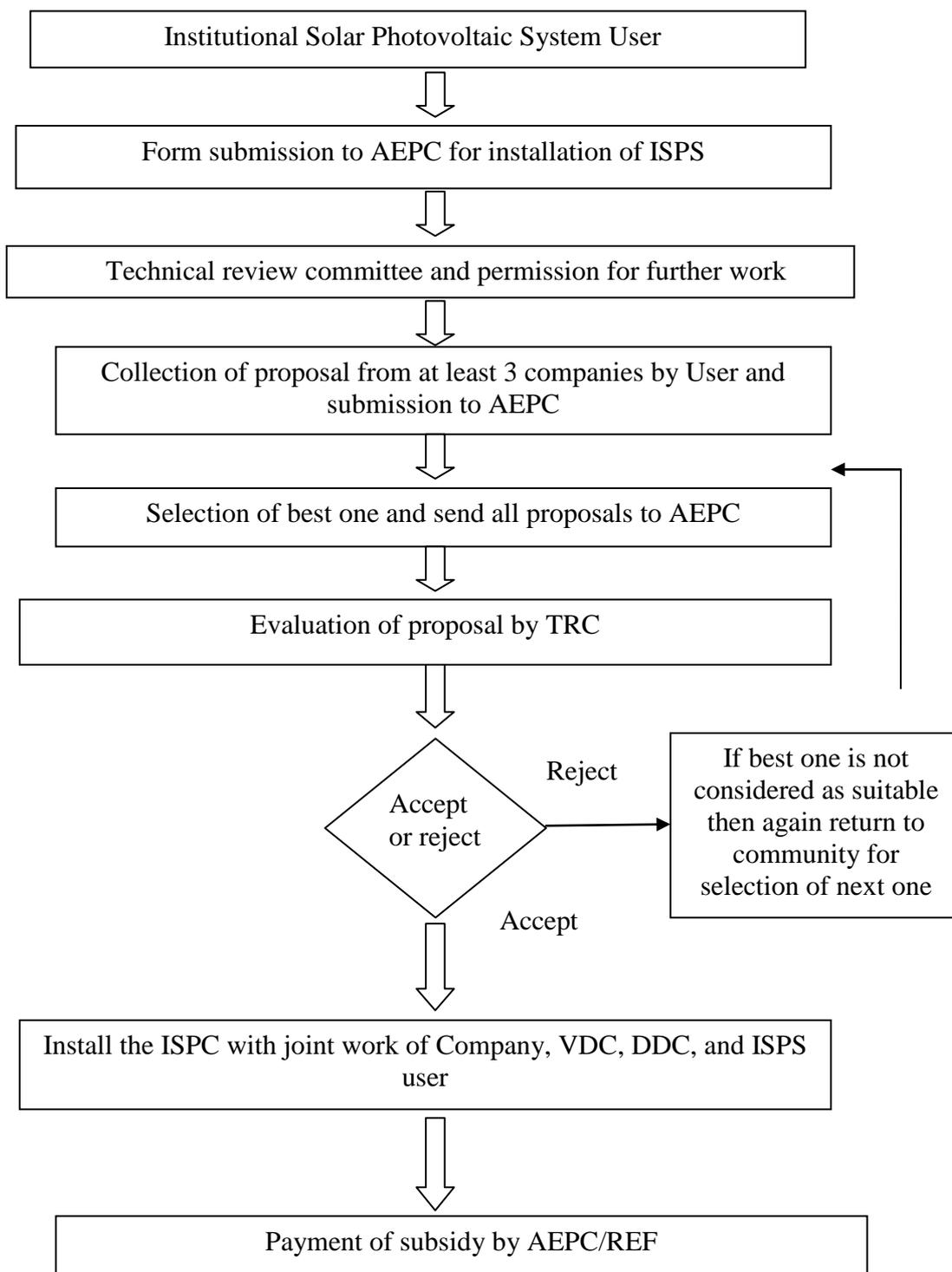


Figure 10: Existing working modality for the promotion of ISPS

Existing working modality for the promotion of Photovoltaic Pumping System (PVPS)

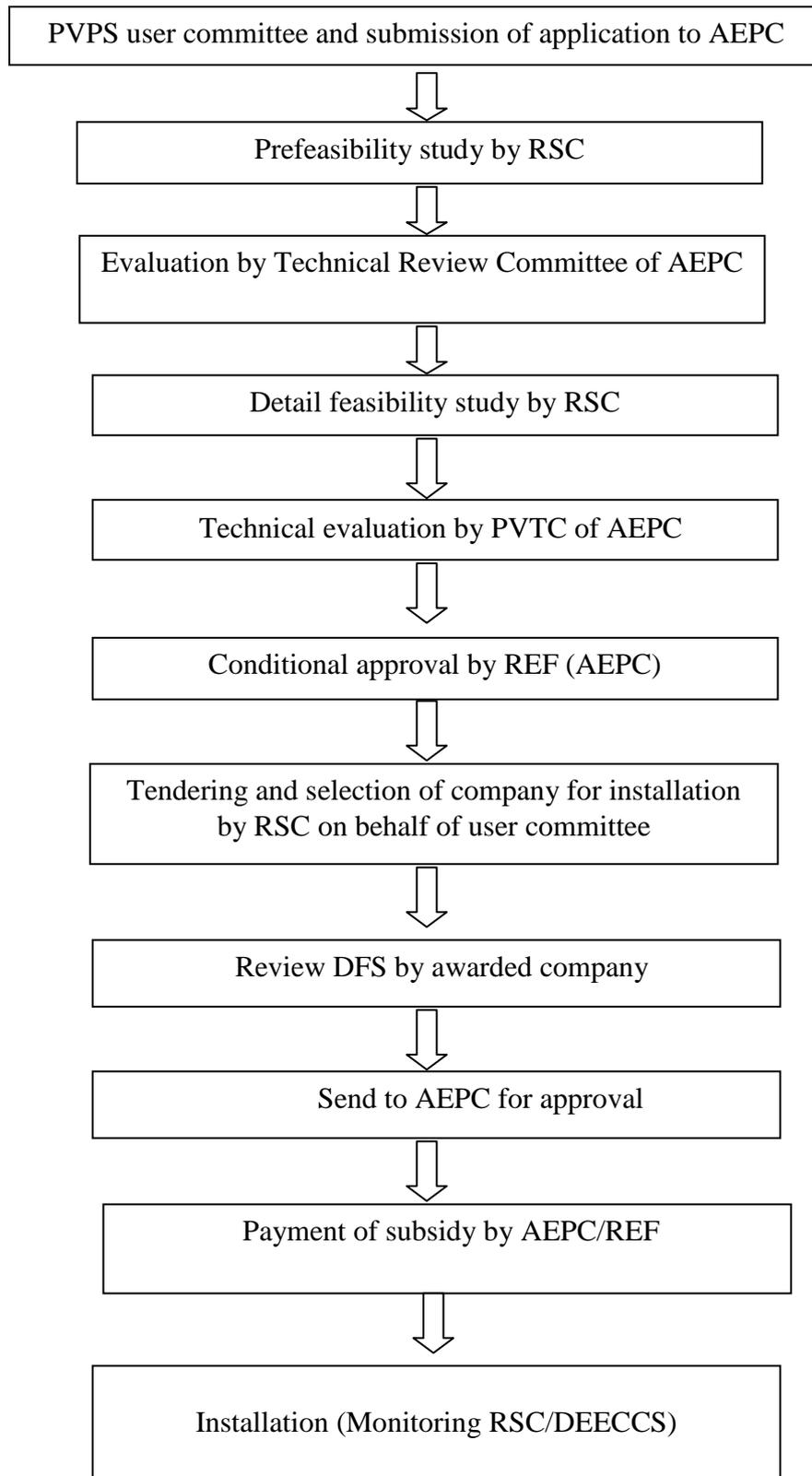


Figure 11: Existing working modality for the promotion of PVPS

Table 4: SWOT analysis of Solar sub component

Strength	Weakness
<p>SHS and SSSH</p> <ul style="list-style-type: none"> Promotion of Solar PV increases adoption of solar PV systems at local level Output oriented service Easy access between company and user <p>ISPS</p> <ul style="list-style-type: none"> Institutional enhancement in PV system adoption Owner can select reliable company for proposal and installation Evaluation of proposal by AEPC technical committee can lead to success of the project <p>PVPS</p> <ul style="list-style-type: none"> Institutional reach for demand based installation at local level 	<p>SHS and SSSH</p> <ul style="list-style-type: none"> Lack of proper information flow and central level concentration Missing in district level roles for subsidy and service delivery <p>ISPS and PVPS</p> <ul style="list-style-type: none"> Non online form submission and approval system Lengthy process <p>PVPS</p> <ul style="list-style-type: none"> Lengthy process
Opportunities	Threat
<p>SHS and SSSH</p> <ul style="list-style-type: none"> Good demand creation by PQ companies Company can install more plant and expand their market Users can select the reliable PQ company based on their performance <p>ISPS</p> <ul style="list-style-type: none"> Institutional upliftment and income generating activities at local level Company enhancement in institutional capacity as well <p>PVPS</p> <ul style="list-style-type: none"> Alternative way for pure during solution and local resources mobilization 	<p>SHS and SSSH</p> <ul style="list-style-type: none"> Sometime mutual collaboration for false work between company and users Companies AEPC linkage for subsidy delivery can make difficulties in awareness regarding subsidy to users <p>ISPS</p> <ul style="list-style-type: none"> Failure due to misunderstanding among Gird connection before maturity period <p>PVPS</p> <ul style="list-style-type: none"> Gird connection before maturity period

Major difficulties are seen in ISPS and PVPS regarding information flow and installation companies accessibility with long delivery mechanism but has the high demand creation component with large reach of PQ companies at local level for SHS and SSSH.

9.5 Gender Equality and Social Inclusion (GESI)

Gender Equality and Social Inclusion (GESI) is mainstreamed into the NRREP at all level including in development objective, immediate objectives in relevant outputs and activities, in indicators and targets as well as in monitoring.

GESI approach challenges on existing chaos in power relationships, structure and institutions by sinking social, political and economic transformation from the household, community, market up to the state level. It assesses the key issues hindering access and articulation of women, poor and socially excluded group in the in participation and benefit sharing and then devises strategy to address these issues to create space for new realities and relationships, so that girls, boys, women and men of any age, class caste, ethnicity, religions identity or different ability are enable to live with dignity, justice and respect, asserting their rights and responsibilities.

Table 5: SWOT analysis of GESI sub component

Strength	Weakness
<ul style="list-style-type: none"> • Social, political and economic transformation through promotion of RETs • It will motivate inclusive group of people for increasing their life standard 	<ul style="list-style-type: none"> • Sometimes other groups of people are segregated
Opportunities	Threat
<ul style="list-style-type: none"> • Local inclusive people in reach of renewable energy option • Equal opportunities for all in energy access mobilization 	<ul style="list-style-type: none"> • Difficulties in identification of such groups

More inclusive and equal opportunities creation for all race and groups of people with this components with some difficulties in identification of such groups and even sometime creates segregation in people.

9.6 Local Bodies Coordination and Outreach Management

Outreach ensures the coordinated expansion of renewable energy technologies through efficient and effective mobilization of local governance bodies, national and regional service delivery organizations and other relevant programs/projects and organizations. This involves coordinating and collaborating to provide a strategic guidance for expanding renewable energy access to the target beneficiaries through capitalizing on the presence of DDCs, National Service Providers (NSPs), Regional Service Centers (RSCs).

Outreach aims to use existing institutional linkages to enhance the livelihood of rural remote people through the increasing use of renewable energy services. Outreach include in all the branch and specific relation with decentralized area.

Table 6: SWOT analysis of Local Bodies Coordination and Outreach Management

Strength	Weakness
<ul style="list-style-type: none"> • Development of linkage between local bodies and AEPC • Coordination between RSCs and local bodies • Promoting the interests of women and marginalized groups • Localized renewable energy agenda at local level 	<ul style="list-style-type: none"> • Lack of proper coordination between local bodies and central
Opportunities	Threat
<ul style="list-style-type: none"> • Local assess of renewable energy with local bodies • Local capacity development and community upliftment through renewable technology • Proper renewable energy assess to target beneficiaries • Mediator supports for linkage between local people to central body • Strengthen function linkage between stakeholders • Supporting planning process at local level 	<ul style="list-style-type: none"> • Sometimes mismatch of bottom up and top down planning approach • Chance of delay of work due to slow bottom up approach

Component helps in coordination between local bodies and regional centers, local capacity building and major focus in RE technology diffusion and community based activities with some difficulties in local level accountability towards regional and district level for bottom up approach delaying the work process.

9.7 Micro hydro

Existing working modality of Micro hydro promotion

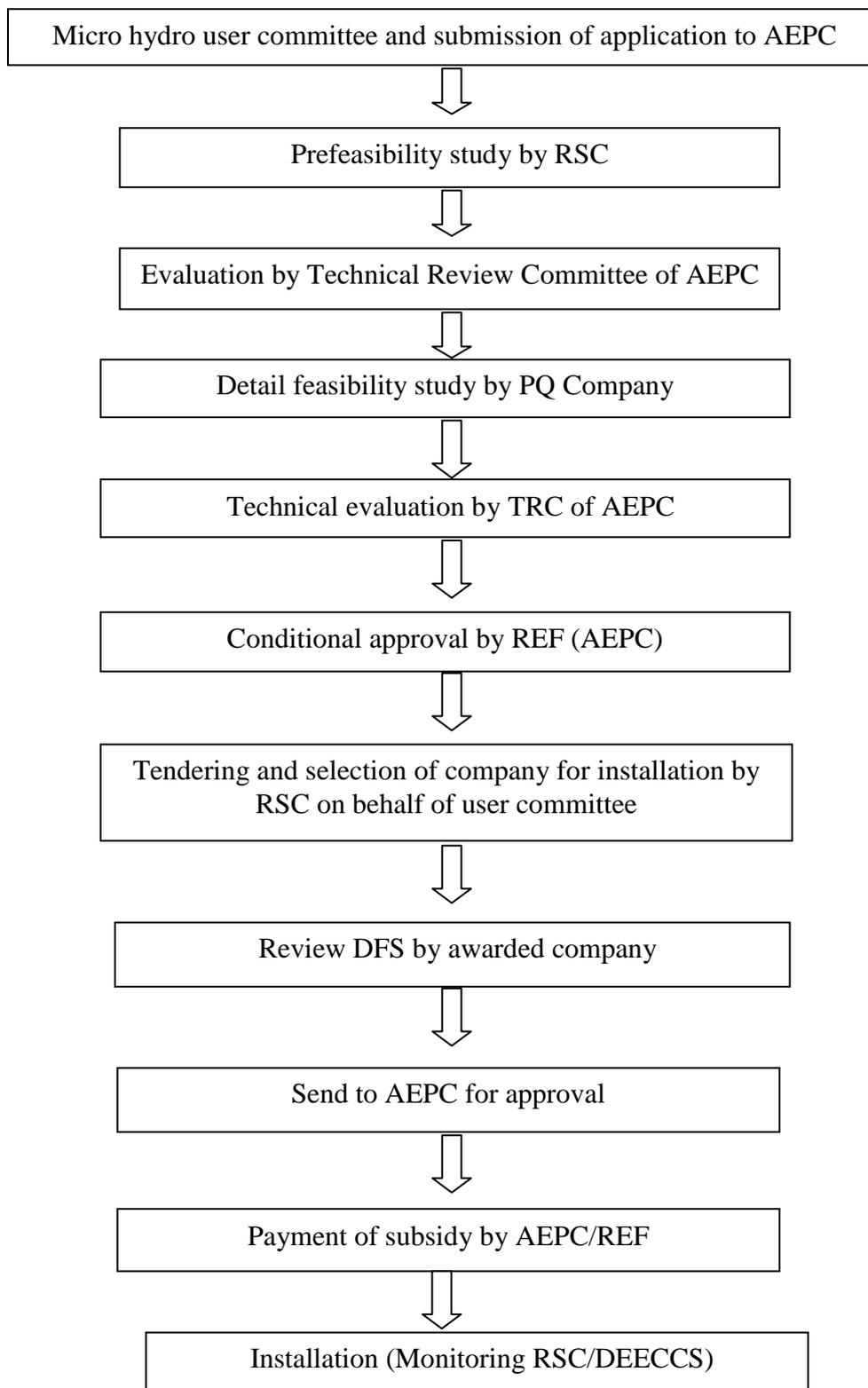


Figure 12: Existing working modality of Micro hydro promotion

Table 7: SWOT analysis of Microhydro sub component

Strength	Weakness
<ul style="list-style-type: none"> • Enhancing the local capacity for local level power generation and demand generation. • Promoting the hydro like proven technology for rural electrification • Well defined channelized process for the completion of prefeasibility, installation and power generation like tasks 	<ul style="list-style-type: none"> • Lengthy process • No online system for documentation • Conditional approval making lengthy process • Borden many unnecessary documentation bodies and central • No consistency in working modality
Opportunities	Threat
<ul style="list-style-type: none"> • Provides opportunities for needy people at local level • Quality outcomes due to involvement of expert during feasibility and detail feasibility study • It is focusing on areas where there is no possibility of National grid in near future. 	<ul style="list-style-type: none"> • Due to lengthy process, some projects may not be completed in time and some user groups are demotivated towards proceed works • As some of the works had not been completed within the time, in the mean time other alternatives have been used so significance of micro hydro has been lessened at those location

Micro hydro development at the local level where there is no accessibility for Grid within 5 years with local demand and consumption opportunities at local level are the major strength of this component with some threats and weakness for local level expertise and feasibility studies deliver mechanism.

9.8 Monitoring and quality assurance sub component

The MQA unit has been setting up necessary M & E systems and tools such as Baseline, MIS, verification, reporting, review and feedback, progress tracking etc. towards instituting results based M & E system. The results based M & E system will therefore design for detailing the operation of the feedback mechanism including how it provide management information to the different level of NRREP management.

The AEPC/NRREP has already framed result area for monitoring and quality assurance as ‘develop and implement AEPC monitoring system for result based managements’. The MQA unit is primary responsible to achieve this result within the program period.

Table 8: SWOT analysis of Monitoring and quality assurance sub component

Strength	Weakness
<ul style="list-style-type: none"> • Target based result based planning, monitoring as well reporting system • Proper information flow at all level with integrating RET data • Output verification mechanism maintaining coordination between all components 	<ul style="list-style-type: none"> • No awarding system for quality works • Difficulties in maintaining quality monitoring
Opportunities	Threat
<ul style="list-style-type: none"> • Quality outcomes • It makes availability of data at a glance 	<ul style="list-style-type: none"> • No expertise for all the RET technologies

Quality assurance and quality monitoring system are delivering by this component for proper diffusion of RE Technologies but have some difficulties of lack of expertise and local quality monitoring bodies at local level.

9.9 Biomass

The Biomass Unit in AEPC has been disseminating different types of improved cooking stoves ICS in all ecological zones of the country. This has significantly contributed towards reducing Indoor Air Pollution (IAP) thereby improving the health of women and children reducing firewood consumption and decreasing the cooking time.

The AEPC through implementing NRREP intends to address this issue by disseminating clean and energy efficient solid biomass technologies for household and institutional cooking and heating purpose as well as finding solution for efficient thermal application in the small and medium scale enterprises where solid biomass is used as primary source of energy.

Table 9: SWOT analysis of biomass sub component

Strength	Weakness
<ul style="list-style-type: none"> • Scale up for efficient technology with proper modality • Quality control system with experts as master 	<ul style="list-style-type: none"> • Hindering process for demand generation • Difficulties in delivering mechanism
Opportunities	Threat
<ul style="list-style-type: none"> • Job creation at local level • Local enterprises development 	<ul style="list-style-type: none"> • Long run difficulties in service mechanism • Lack of experts for long term

This component has the high potential for local resources mobilization and local enterprises development but with some difficulties of lengthy service and subsidy delivery mechanism.

9.10 RSC

The main roles and responsibilities of RSCs are as follows:

- Provide technical and advisory support to DDCs and DSCs
- Conduct regional level review and planning workshops involving all DDCs and DSCs for enhancing regional level coordination and cooperation
- Maintain Management Information System (MIS) database of all the districts under RSC and report to BESC/NRREP/AEPC and DDCs
- Support private sector in promoting ICS

The SWOT analysis of RSC is presented in table below

Table 10: SWOT analysis of RSC

Strength	Weakness
<ul style="list-style-type: none"> • Output oriented job • Motivation for specific assigned task • Good networking • Expertise in people mobilization for implementing RETs. • Geographical coverage 	<ul style="list-style-type: none"> • Own planning cannot implement , only do the works according order • Not well visualization • Uncertainty, no accountability • No legal entity • RSCs identify different ways for implementation of RETs but has to be concise for contract agreement
Opportunities	Threat
<ul style="list-style-type: none"> • Facilitate user for assigned task • It is providing information about RETS to user groups 	<ul style="list-style-type: none"> • Loosing opportunity to implement RET • Staff turnover high

9.11 DEECCS

The main roles and responsibilities of DEECCS are as follows:

- Select and enter into contract with DSC. DDC/DEECCS will evaluate performance of DSC on annual basis the result of which will have contractual implications for the continuation and renewable of the contract
- Own ICS program as one of the programs of DDC by internalizing it in its planning process
- Mobilize resources for the conduction of different activities
- Supervise DSC to ensure smooth and timely accomplishment of planned activities
- Coordinate with all the stakeholders at district level to avoid duplications and fill resource gaps

The SWOT analysis of DEECCS is presented in table below

Table 11: SWOT analysis of DEECCS

Strength	Weakness
<ul style="list-style-type: none"> Decentralized network to all districts Energy assessment and demand at local level 	<ul style="list-style-type: none"> No own planning, only do the works according to order Not expertise in all RETs by single person and limited resources No awarding system at DEECCS for good performance (no proper evaluation of DEECCS works by central)
Opportunities	Threat
<ul style="list-style-type: none"> Facilitate user for assigned task Promotion of RET at local level 	<ul style="list-style-type: none"> Loosing opportunity to implement RET Dual responsibility for Energy and Environment officer at DEECCS (staff of DDC or AEPC) may create job dissatisfaction Contract system may create lead them to look for alternative job and consequently paralyzed the objectives of AEPC at local level

9.12 SWOT Analysis for Linkage

SWOT analysis of different linkage among AEPC/NRREP, RSC/NSP, DEECCS and PQ companies has been performed

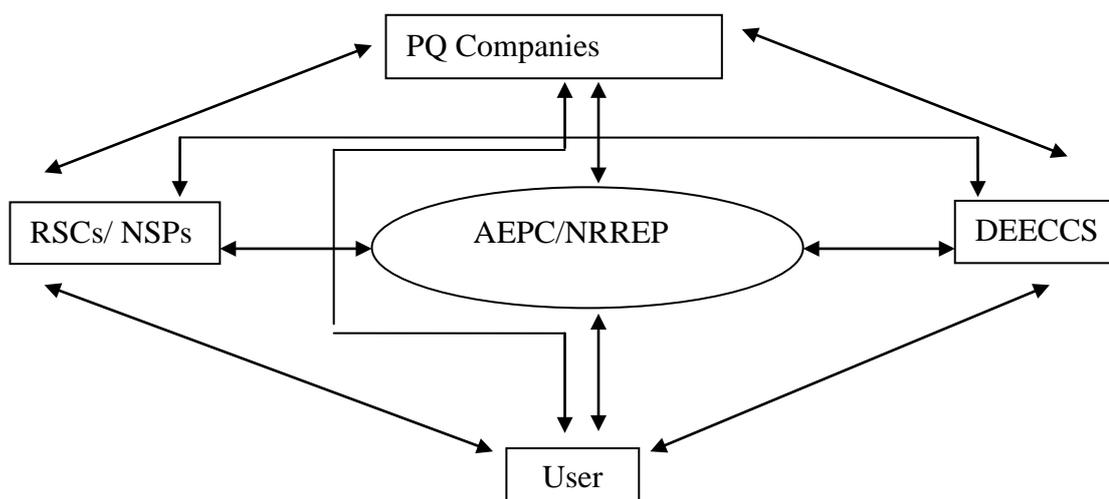


Figure 13: Linkage of different stakeholders

The SWOT analysis of AEPC and RSC linkage is presented in table below

Table 12: SWOT analysis of AEPC and RSC linkage

Strength	Weakness
<ul style="list-style-type: none"> • Pivotal institution for the implementation of RET • RSCs are the strong implementing partner for supporting AEPC for the promotion of RET 	<ul style="list-style-type: none"> • Limited scope (Due to contractual agreement, basic requirement of people for the promotion of RET cannot be done through RSC or sometimes RSC can identify different way than the contract agreement which they cannot go)
Opportunities	Threat
<ul style="list-style-type: none"> • Fulfill the objective of AEPC for the promotion RET 	<ul style="list-style-type: none"> • Uncertainty for the termination of works due to dispute or any administrative process • Weak coordination for different administrative modality in two of them (Partnership model value not addressed)

The SWOT analysis of AEPC and DEECCS linkage is presented in table below

Table 13: SWOT analysis of AEPC and DEECCS linkage

Strength	Weakness
<ul style="list-style-type: none"> • Authorized government organization at district level for RET promotion 	<ul style="list-style-type: none"> • Not fully dissemination of responsibilities for DEECCS from central level • Slow administrative coordination • Lack of proper resources • Dual responsibilities to both DDC and AEPC
Opportunities	Threat
<ul style="list-style-type: none"> • Due to establishment of district level, several works can be monitored, promote at local level • Reach community based activity at central level • Transfer of responsibilities for monitoring and evaluation work at local level 	<ul style="list-style-type: none"> • Lengthy and time consuming documentation process sometimes leads in demotivating in RETs promotion at local level • Incomplete work and high turnover of staff due to dual nature of work and uncertainty of job

The SWOT analysis of AEPC and PQ companies' linkage is presented in table below

Table 14: SWOT analysis of AEPC and PQ companies linkage

Strength	Weakness
<ul style="list-style-type: none"> • Strong linkage • Motivation for private sectors 	<ul style="list-style-type: none"> • Company may misuse responsibility in terms of quality and timely work due to lagging of complete controlling mechanism • No strong monitoring, rewarding as well as penalizing mechanism as a result of this the companies don't perform the works in time in some cases • Companies mainly focus on own benefits rather than implementation of RETs
Opportunities	Threat
<ul style="list-style-type: none"> • Local level entrepreneurship development • Create quick channel between supply and demand 	<ul style="list-style-type: none"> • Focusing of PQ companies for their accessible areas and focus for own benefit however AEPC objective is to promote RET throughout the country

The SWOT analysis of RSC and DEECCS linkage is presented in table below

Table 15: SWOT analysis of RSC and DEECCS linkage

Strength	Weakness
<ul style="list-style-type: none"> • Works along with decentralized approach • Local level RETs promotion 	<ul style="list-style-type: none"> • Limited linkage • Undefined work divisions • Lack of coordination • Duplication of work (Same area of work division for various component)
Opportunities	Threat
<ul style="list-style-type: none"> • In some cases, due to their joints efforts with clear work division for promotion of RETS at local level they are providing fruitful results 	<ul style="list-style-type: none"> • Lack of harmonized functional linkage may paralyzed the function of AEPC at districts level • Due to lack of well defined work division many viable works related to RET promotion are missing

The SWOT analysis of RSC and PQ companies' linkage is presented in table below

Table 16: SWOT analysis of RSCs and PQ companies linkage

Strength	Weakness
<ul style="list-style-type: none"> • Regional based linkage • Facilitator works for local level 	<ul style="list-style-type: none"> • Lack of gearing of work due to limited authorization of work for the coordinating organization • No harmonized relation for RETs promotion and implementation
Opportunities	Threat
<ul style="list-style-type: none"> • Fulfill the objective of AEPC for the promotion RET 	<ul style="list-style-type: none"> • Uncertainty for the termination of works, due to not complete responsibility of company to RSC and there may misuse of power due to direct contact way to AEPC

The SWOT analysis of DEECCS and PQ companies' linkage is presented in table below

Table 17: SWOT analysis of DEECCS and PQ companies' linkage

Strength	Weakness
<ul style="list-style-type: none"> • Direct local level involvement for RETs promotion and installation 	<ul style="list-style-type: none"> • Limited boundary of works • Lack of local level experts
Opportunities	Threat
<ul style="list-style-type: none"> • Fulfill the objective of AEPC for the promotion RET • Mobilization of local community 	<ul style="list-style-type: none"> • Uncertainty for the termination of works • Changing in companies in district level • Possibility of either monopoly or no service delivery due to limited number or unavailability of companies

9.13 Summary of identified gaps and processes

Existing situation analysis of subsidy delivery mechanism and subsidy process in terms of program, process and structure to solicit interests, complaints, issues and needs of beneficiaries are as follows.

Table 18: Gap analysis on the existing system

System	Existing Modalities	Gaps	Desired Modalities
Program	RETs pricing	<ul style="list-style-type: none"> • No unit cost modality for all technologies • Companies sale the equipment on their own rates • In case of biogas the unit cost for different equipment /parts has been mentioned but the indirect and overhead cost are very high in comparison to total cost 	Well defined cost
	No defined time for review of RETs documents	<ul style="list-style-type: none"> • Internal processing is very lengthy • No clear intermediary status of documents submitted and proposal presented 	There must be fixed time for approval of each step for proposal
Process	Long service delivery and subsidy process	<ul style="list-style-type: none"> • No online submission and approval system • Lengthy administrative/ evaluation process • No standard forms for application and other documents • Submission of unnecessary documents (repeated administrative process) • No time constraints for AEPC, RSC, DEECs and other authorities to provide decision on proposal • Lack of individual responsibility to make decision within stipulated time 	Fast track system for service delivery and subsidy
	Time consuming documentation process	<ul style="list-style-type: none"> • It takes much time to send documents from central to RSCs and DEECCS and vice-versa • Lengthy and expensive process • Can't access all documents by all authorized body at the same time if it is needed • Users do not know easily the status of his/her work 	Paperless and online system
	Required to	<ul style="list-style-type: none"> • Time consuming and expensive for users 	Facility to

	visit central office for many community level projects	<ul style="list-style-type: none"> • Lengthy administrative process • Lack of decentralized communication system • De motivation to users due to centralized system 	submit all the documents and applications at district centers
Structure	Having no single stop to provide all the information at local level about RE	<ul style="list-style-type: none"> • Users need to visit different places for getting information about RE Technology, its service and subsidy delivery mechanism • Lack of RE Technology market mapping 	Energy information center at local level
	Focus of RSC and companies around the accessible areas	<ul style="list-style-type: none"> • Minimal access of people • Difficult to reach RE technology to needy people • Focus for nearest distance from RSC 	Increase Access to users through establishing energy hub
	Different working modality	<ul style="list-style-type: none"> • Each component has its own working modality for the promotion of RE technology • Difficult to understand different modality • Time consuming and expensive 	Simple and harmonized working modality
	Nine Regional Service Centers	<ul style="list-style-type: none"> • Role and responsibilities as per contract agreement between AEPC and RSC. So they can not focus on need of beneficiaries 	Need regional center with authority
	75 DEECCS /DDCs	<ul style="list-style-type: none"> • Limited roles of DEECCS/DDCs, generally performing assigned work from central • No usual authority to approve prefeasibility for each sub-components program • Lack of demand creation for RE at local level • Weak promotion strategy at local level 	75 DEECCS /DDCs with more roles, responsibilities and authorities, coordinating body at regional level
	Repetition of work	<ul style="list-style-type: none"> • Duplication of works and responsibilities between DEECCS and RSCs • Time consuming 	Clear work division

Weak linkage	<ul style="list-style-type: none"> • Links for Private Companies in districts with RSC and DEECCS are weak 	Need of regional body which can link the stakeholders
Lack of authority decentralization	<ul style="list-style-type: none"> • Lack of effective decentralization system • Local and community level are facing problem for getting information about RETs as well as administration process, installation, testing facilities, subsidy mechanism, operation and maintenance etc • Difficulties in flow of responsibilities and duties • Lack of effective facilitators with decentralized nature. 	With proper power delegate
Weak feedback mechanism	<ul style="list-style-type: none"> • Weak feedback mechanism in the present modality leads to less effectiveness subsidy delivery system. 	Strong mechanism
Users Demand is Respond by all Actors of AEPC/NRREP but Decision is made by Central Level	<ul style="list-style-type: none"> • Minimal Resources Decentralization • No division of authority at regional and district level 	Decentralization at regional level

10. FEASIBILITY/VIABILITY OF ENERGY HUB

It is indispensable to build facilitators with conducive environment which will self motivate and mobilize renewable energy users groups, local institutions, non-government organizations, cooperatives and private sector for the development and promotion of rural energy resources using sustainable technologies. The establishment of Energy Hub should fulfill the above gaps in order to make the development, promotion, installation, monitoring, and proper subsidy mechanism of AEPC. As existing modality have their own limitation, Energy hub may facilitate stakeholders more effectively in addition it may link demand and supply gaps of local energy needs.

The work of Energy Hub is to facilitate Regional service center and DEECCSs, which may reduce the burden of center body AEPC and these will improve the efficiency. It may reduce the conflict of division of works and make it more systemized of all body

(regional and district level unit). Energy Hub will regulate coordination between DDCs, DEECCS and Regional Service Center for each district facilitation.

Feasibility of Energy hub include of following factors;

- Management/Governance- Proper governance quality and management skills to look after the whole center and facilitate them. The energy hub will be able to mobilize the resources at local level and provide testing facilities to the users' groups as well as private companies.
- Infrastructure- sound infrastructure to provide proper services and facilities.
- Legal/policy- proper legal strategy and effective policy to minimize the legal and other legislature issues.
- Institutional- institute must be strong and effective with energy hubs established following proper institutional running concepts. The institutional capacity of the energy hub should be sound such that it can play leadership roles in development/ promotion of RETs at the local level. The energy hub should be able to cooperate for planning, implementation, monitoring and evaluation among all the stakeholders including users' group, GOs, I/NGOs, and private sectors.
- Administrative- administration can be managed by regional level hubs with proper flow of roles and responsibilities to districts level and accountability towards center.
- Adaptability- must adapt by the various levels and bodies in proposed modality.
- Financial- financially sound to facilitator for regional level and monitoring at VDCs level.
- Social- The establishment of energy hub will be socially-acceptable. The role and activities of the hub will be finalized considering socio-cultural norms and values at the local level. Moreover, social mobilization will be encouraged in activities for rural energy development and dissemination.
- Research and development- The needs of research and development at local level in order to solve the problems/ challenges during the promotion and implementation of RETs will be integrated part of the energy hub.
- Liaison- In case of linking the main body with their wings at local bodies' energy hub can play the important role making bride relationship.
- Networking/ Linkage- Besides liaison, networking with local bodies and other agencies is also the part and roles of energy hub at regional level.
- Monitoring- Energy hub can also play the role of monitoring body of the local level units and other service delivery agencies for quick feedback for central in less time.
- Service and subsidy delivery-The above mention points are also the basis for service and subsidy delivery quickness which is hope to fulfill through establishment of energy hubs.

Feasibility regarding deployment of Energy Hubs

- Government programme should have tried to use more of the government apparatus than the NGOs as the government institutions are permanent in nature and RET services could be provided in a more sustainable manner
- NRREP should decisively consider its implementation through government mechanism, but should not abandon the roles of RSCs abruptly
- Other larger government programmes have been running through government mechanism and strengthening the system, but NRREP seems as likely threat that system strengthening would be taken far away for some years.
- There are less accountability and ownership RSC activities in districts as well as there are no real coordination between DDCs and RSCs.
- As an NGO, a RSC is likely to cease working on RETs after NRREP phases out. Moreover, by nature as well as by virtue of the contractual arrangements with them, RSCs cannot be useful for sustainable development of RETs
- Hub will work as
 - Decentralize power from center
 - Provide service for the geographical remote area
 - Help to achieve the objective in smokeless country in 2017
 - Promote biogas in the potential area
 - Coordinate the RSC, DEECCS and companies
 - Goes with responsible ways for monitoring and promotion of RET in remote areas

So, due to this reasons viability of Energy hubs seen to be necessity to eradicate mismatching responsibilities of RSCs and DEECCS and for proper delivery of subsidy and services to local level, government bodies as RSCs (part of NRREP) need to be necessity to deal with DSCs/DEEU government bodies.

Financial Estimation per Energy Hub

Detail financial estimation for human resources, tentative activities per Energy Hub has been done for human resources, infra structure and other based on existing salary structure, market price and minimum facilities.

a) Fixed cost

Furniture cost

Table 19: Cost for furniture

S.N.	Location	Item Description	Qty.	Price (NPR)
1.	Engineer (Head)	Table (6' * 4')	1	15,000
		Revolving chair	1	10,000
		Visitor's chair	4	4,000
		Steel almirah	1	4,000
		File cabinet	1	5,000

		Bookrack	1	8,000
		White Board	1	1,500
		Computer table	1	4,000
		Tea table	1	3,000
2.	Engineer	Table (6'*4')	2	30,000
		Revolving chair	2	20,000
		Visitor's chair	8	8,000
		Steel almirah	2	8,000
		File cabinet	2	10,000
		Bookrack	2	16,000
		White Board	2	300
		Computer table	2	8,000
		Tea table	2	6,000
3.	Assistant Engineer	Table (6'*4')	2	30,000
		Chair	2	2,000
		Visitor's chair	4	4,000
		Steel almirah	2	8,000
		File cabinet	2	10,000
4.	Supporting staff	Table(4'*3')	2	12,000
		Chair	4	4,000
		Steel almirah	2	8,000
Total		-	-	238,800

Vehicle cost

S.N.	Description	Rate (NPR)	Qty.	Costs (NPR)
1.	Vehicle	1,500,000	1	1,500,000
Total				1,500,000

b) Operating cost

Human Resources

Table 20: Cost for Human Resources

S.N.	Name of Post	Number required	Rate (NPR)	Cost (NPR)	Annual Cost (NPR)
1.	Engineer (Head)	1	26,838	26,838	322,056
2.	Engineer	2	26,838	53,676	644,112
3.	Assistant Engineer	2	20,679	41,358	496,296
4.	Supporting staff	5	19,481	97,405	1,168,860
Total		10	-	-	2,631,324

Office operating cost

Table 21: Office operating cost

S.N.	Description	Rate (NPR)	Qty.	Costs (NPR)
1.	Office rent	Lump Sum		500,000
2.	Office Overhead	25,000	Lump Sum/ Month	300,000
3.	Maintenance	25,000	Lump Sum/ Month	300,000
4.	Allowances	Lump Sum		2,500,000
5.	Capacity building	Lump Sum		2,500,000
Total				6,100,000

Cost summery

Table 22: Cost summery

Fixed cost	
Description	Amount (NPR)
a) Furniture cost	238,800
b) Vehicle cost	1,500,000
Total fixed cost	1,738,800
Operating cost	
Description	
a) Human resource	2,631,324
b) Other cost	6,100,000
Total operating cost	8,731,324

11. PROPOSAED MODALITY AND RECOMMENDED LIST OF ACTIVITIES

Identified gaps and processes, recommend list of activities that can be conducted by AEPC branch offices (Energy Hubs) in other word Existing system of the AEPC can be more decentralized and access for the remote region from center by changing

- Structure
- Process

11.1 Proposed structure

Existing structure can be changed by giving more responsibilities to DEECCS and along with establishment of Energy hub. The propose hubs are Eastern Energy Hub, Western Energy Hub and Central Energy Hub, which will be placed in Biratnagar, Nepalgunj and Kathmandu respectively.

For the easy access of Eastern and Western users Eastern and Western Energy Hubs have been proposed. Central Energy Hub can provide better service for central part users and will proposed as a one unit of main office of AEPC.

Other Energy hubs will be establishment on the basis of performance of three Energy Hubs. During the establishment of hub in central part of Nepal, RSC coverage districts may be changed.

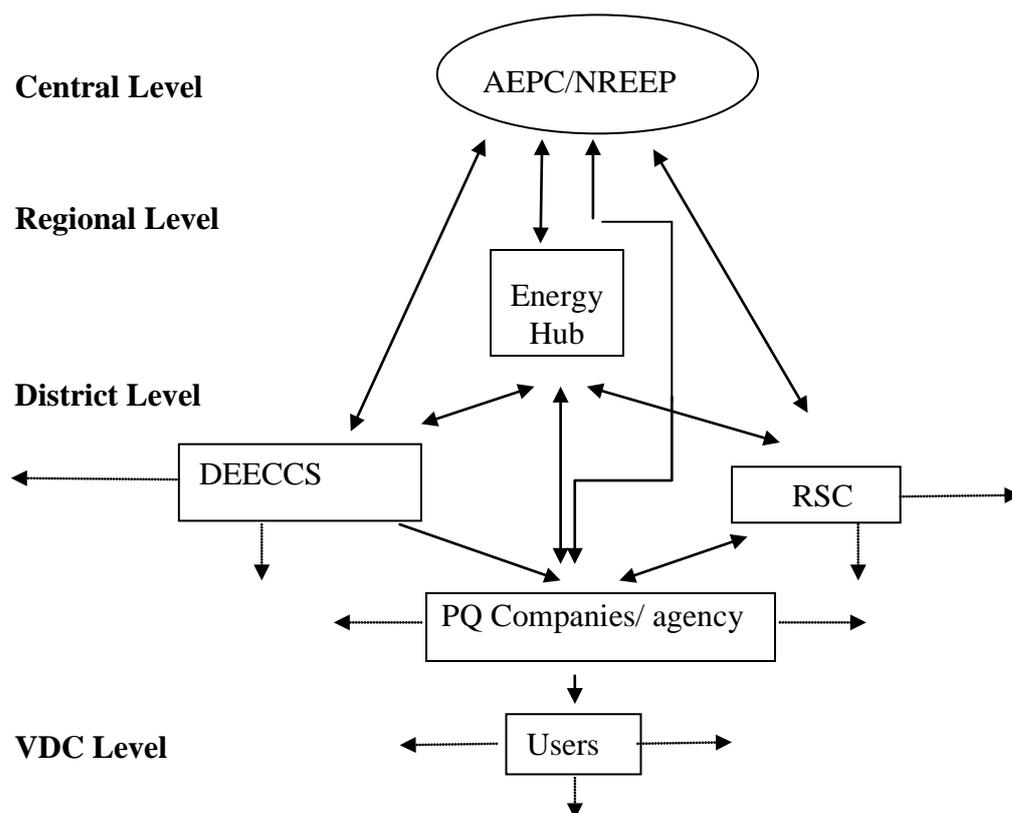


Figure 14: Structure of the proposed Energy Hub

Pros of energy hub modality

- Office would be permanent type as government entity for long period
- Permanent modality makes the working staffs more motivate to woks.

Cons of energy hub modality

- Might be problem during federalism in nation
- Permanent modality can also make sometimes less efficient of staffs moral

Coverage of Energy Hub

Hub would be permanent body for the coordination and promotion of RE technology at the remote area. All the activities around the hub will come through Hub. Central unit will work as hub. Coverage district of hub and AEPC is shown as below.

Table 23: Coverage of Energy Hub

Coverage	Eastern Energy Hub	Central Energy Hub	Western Energy Hub
RSC/ (NSP)*	REWSSPC, SCDC, NCDC	DCRDC, RESDTN, REMREC, (RETSC, BSP/NBPA)*	RDSC, ASTHA, BASE
DECCS	Parsa, Dhanusa, Sankhuwasabha, Bara, Siraha, Taplejung, Rautahat, Saptari, Terathum, Sarlahi, Sunsari, Bhojpur, Mahottari, Morang, Dhankuta, Jhapa, Panchthar, Illam	Mustang, Manang, Kathmandu, Kaski, Lamjung, Bhaktapur, Parbat, Gorkha, Lalitpur, Syanja, Tanahu, Kavre, Palpa, Dhading, Ramechhap, Gulmi, Chitwan, Okhaldhunga, Magydi, Makwanpur, Solukhumbu, Baglung, Rasuwa, Dotakha, Kapilbastu, Nuwakot, Udayapur, Rupendehi, Nawalparasi, Khotang, Sindhuli, Sindhupalchowk	Dadeldhura, Humla, Rukum, Baitadi, Mugu, Salyan, Darchula, Jumla, Rolpa, Doti, Jajarkot, Pyuthan, Bajhang, Banke, Dang, Bajura, Kalikot, Dolpa, Achham, Dailekh, Arghakhachi, Kailali, Bardiya, Kanchanpur, Surkhet

Modification in working modality

For community based project administrative process and subsidy disbursement process will be made uniform. General modality and specific cases for the community based RET promotion modality as shown as follows

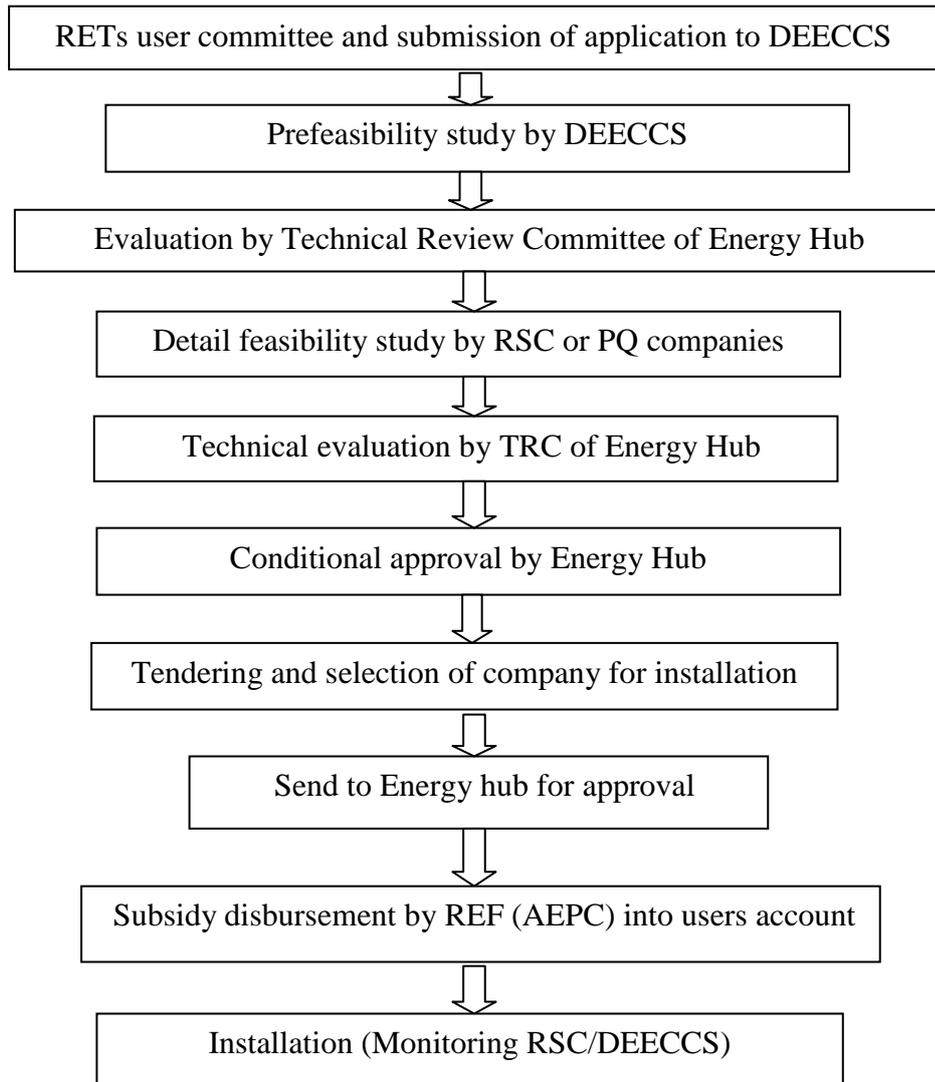


Figure 15: Generalized modality for all community based RET promotion

Proposed modality of Productive Energy Use is as follows

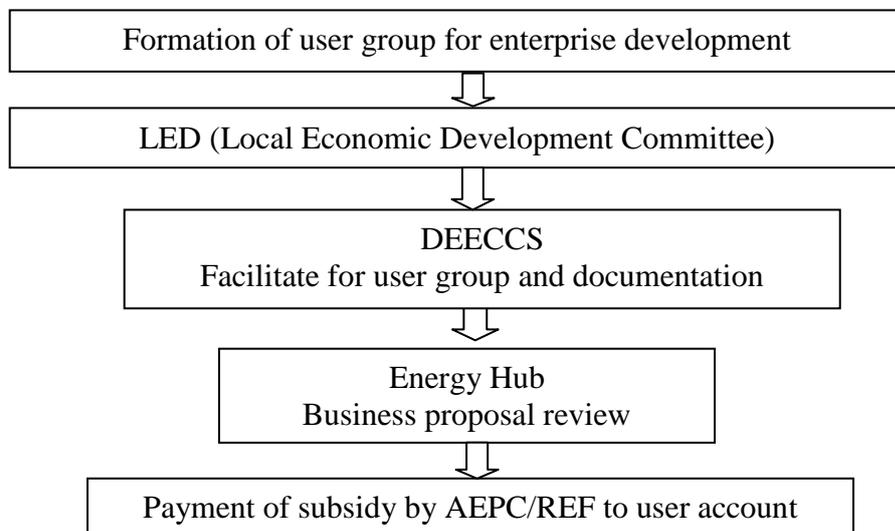


Figure 16: Proposed modality of Productive Energy Use

Proposed modality of Micro hydro promotion

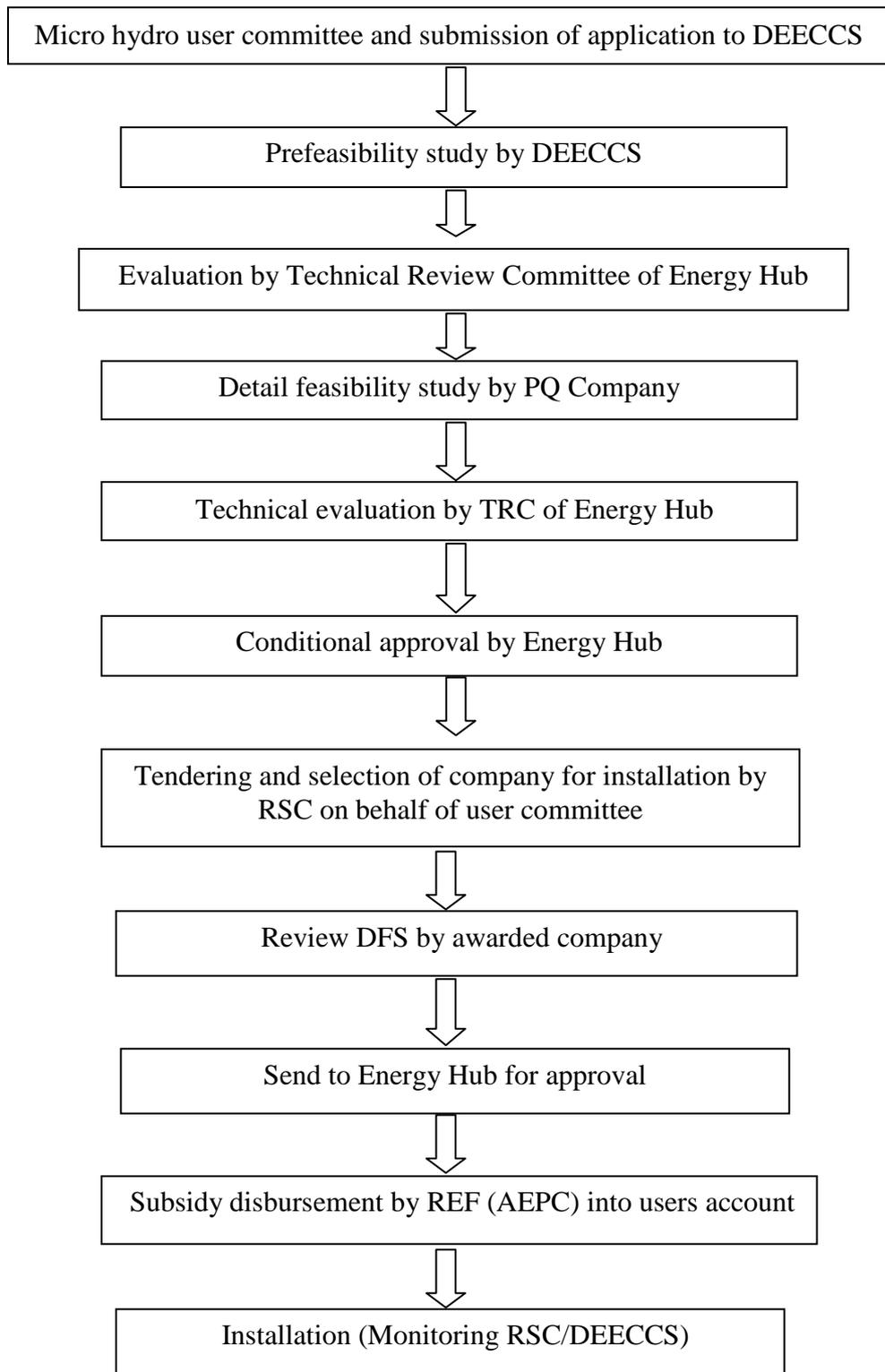


Figure 17: Proposed modality for Micro hydro promotion

Proposed modality for the promotion of Institutional Solar Photovoltaic System (ISPS)

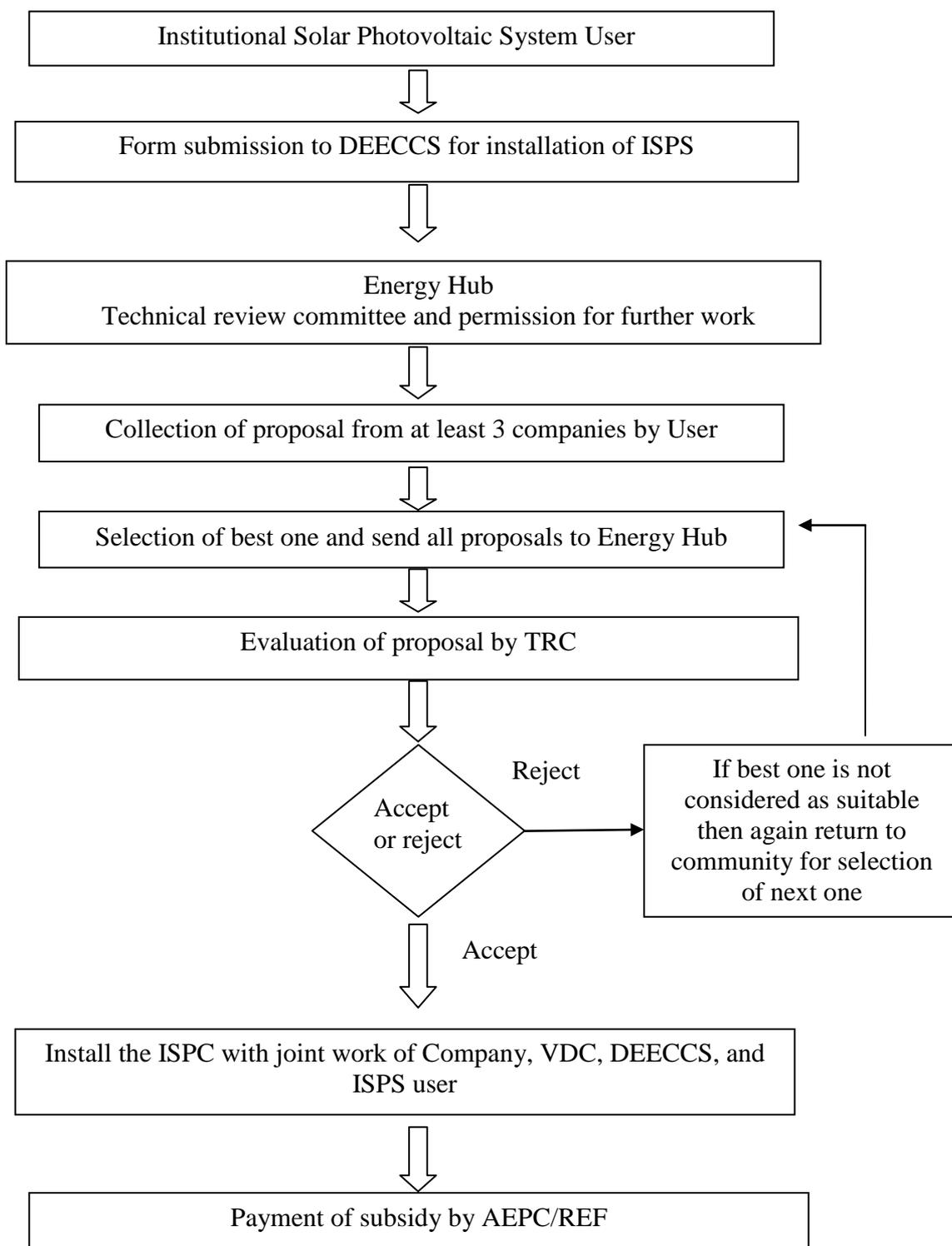


Figure 18: Proposed modality for ISPS promotion

Proposed modality for the promotion of Photovoltaic Pumping System (PVPS)

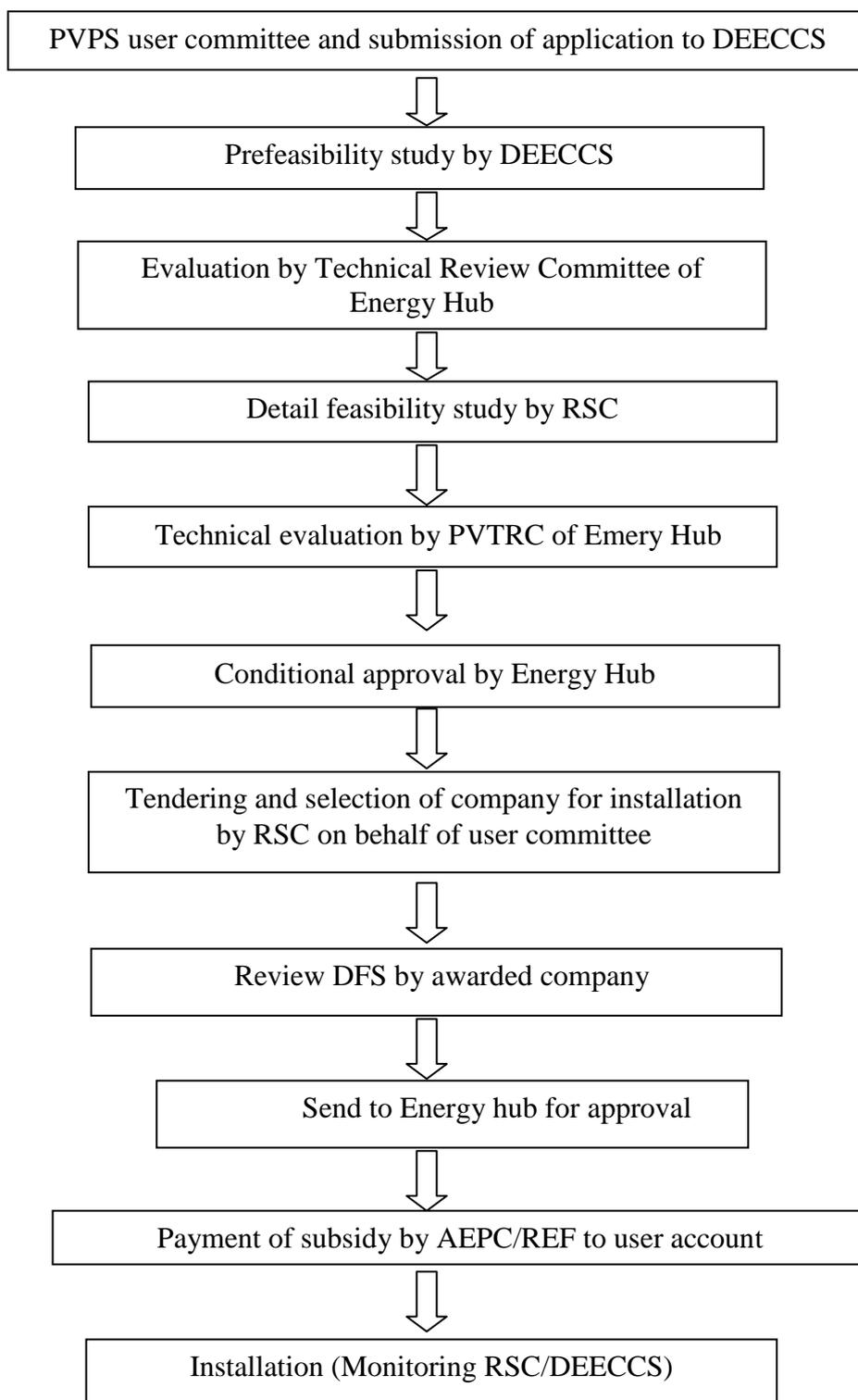


Figure 19: Proposed modality for ISPS promotion

Proposed modality of SSHS/SHS promotion

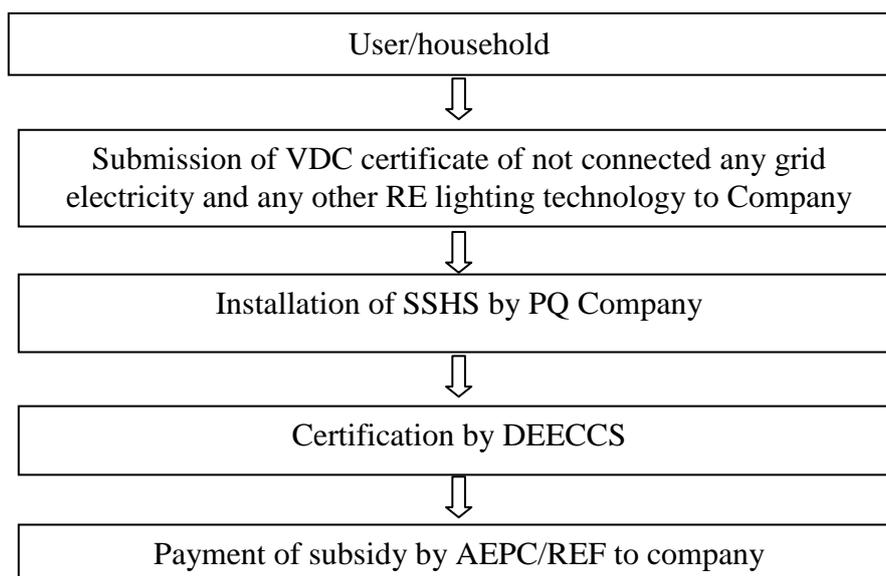


Figure 20: Proposed modality of SSHS/SHS

Objective of Energy Hubs

The main objective of Energy Hubs is to accelerate renewable energy service delivery with better quality, coordinate with all the stakeholders to integrate non-access regions, and to remote rural people and enterprises.

Specific objectives

- To work as a facilitator for DEECCS, RSCs, PQ companies and other stakeholders
- To reduce the administrative processing time
- To provide recommendation for subsidy disbursement
- To provide accessibility to the beneficiaries

Role and responsibility of Energy Hubs

- Act as Hubs at regional level for RE service delivery
- Planning, coordination, facilitating, monitoring and reporting bodies
- Database Management and information dissemination at regional level
- Quality control of promoted RETs at regional level
- Capacity building and institutional development of local bodies
- Approval of prefeasibility and feasibility work at local and regional level

11.2 Proposed process

RETs promotion, administrative and subsidy disbursement process should be modified in Existing system

- Provision for submission of document online as well as hard copy through DEECCS and/or Energy Hubs
- Prefeasibility start from DEECCS and/or Energy Hubs
- Feasibility will be done at Energy Hubs
- Verification process should go from Energy Hubs and/or central level for both SHS and SSHS
- Provision for online tracking status
- Subsidy provision from different institution should make from one center

12. LIMITATION

Proposed modality and structure do have some limitation, which are mention below;

- The modality would have difficult during the country adapt on federal states or provinces.
- May be difficult for staffs and beneficiaries for some period to shift from one structure to another.
- Many numbers of staffs may either replace or added cause direct effect in official works.

13. CONCLUSIONS

The assign task has following conclusion as mentioned below:

- With existing lengthy service delivery mechanism and difficult accessibility for the users far from center, so it is needed to improve process as well as structure in present system.
- The process can be improved with online submission and approval system, generalized process for all the components and providing standard formats for documentation process.
- The structure can be modified with establishment of Energy Hubs and Energy Information Desk at regional level in order to increase accessibility for beneficiaries.
- With the establishment of Energy Hubs, the coordination among AEPC, RSC and DEECCS will be strengthened to provide fast RE service delivery to the beneficiaries. In addition, the load of AEPC will be decreased as well.

14. RECOMMENDATIONS

Following are the recommendations are made for structure and process of the system

Structure

- Three Energy Hubs at Eastern (Biratnagar), Western (Nepalgunj) and Central (Kathmandu) regions with defined roles, responsibilities and authorities should be established to provide better accessibility for remote people.
- After the evaluation of the performance of three Energy Hubs, other Hubs can be established in the other parts of the country .

- Energy Information Desk at each Energy Hubs to provide information of all RETs would be the better option for proper diffusion of technologies.

Process

- Generalized process for all RETs promotion and service delivery mechanism make solution for user's confusion
- Documentation, prefeasibility study and feasibility study should be performed in coordination with RSC, DEECs and other stakeholders
- Online documentation system should be implemented to improve the existing administrative process
- Standardized format for all the documentation process of various RETs promotional activities should be implemented

ANNEXES

ANNEX 1: TEAM COMPOSITION

The study has been carried out by a group of experienced consultants. As per the TOR, the study team has been involved

- Team leader/program coordinator
- RE Expert
- Local governance expert
- Social expert
- Financial expert
- Support staff

S. N.	Name	Position	Qualification	Experience
1.	Mr. Hari Bahaduer Darlami	Team Leader	M.Sc. RE Engineering, BE Mechanical , Masters of Business Studies	10+ Years
2.	Dr. Ajay Kumar Jha	RE Expert	Ph.D.	10 +Years
3.	Dr. Pratap Chatkuli	Local governance expert	Ph.D.	15 +Years
4.	Ms. Bishnu Kumari Budha	Social Research Expert	M.S. Sociology	5+ Years
5.	Mr. Ram Prasad Paudel	Financial Expert	Masters of Business Studies	10 +Years
6.	Mr. Chiranjibi Acharya	Support staff	B.E. Mechanical	1+ Year

Annex-2: RSC and NSP location and its coverage district

S.N.	RSC	Coverage districts
1.	Namsaling Community Development Centre (NCDC)	Sankhuwasabha, Bhojpur, Dhankuta, Taplejung, Terathum, Panchthar, Illam
2.	Sagarmatha Community development Centre (SCDC)	Dhanusa, Siraha, Saptari, Sunsari, Morang, Jhapa, Udayapur, Khotang
3.	Renewable Energy Water Supply and Sanitation Promotion Centre (REWSSPC)	Parsa, Bara, Rautahat, Sarlahi, Mahottari, Sindhuli
4.	Resource Management and Rural Empowerment centre (REMREC)	Kathmandu, Bhaktapur, Lalitpur, Kavre, Ramechhap, Okhaldhunga, Solukhumbu, Dolakha, Sindhupalchowk
5.	Rural Empowerment Society (RESDTN)	Manang, Lamjung, Gorkha, Tanahun, Dhading, Chitwan, Makawanpur, Rasuwa, Nuwakot, Nawalparasi
6.	Dhaulagiri Community Resource Development Centre (DCRDC)	Mustang, Kaski, Parbat, Syangja, Palpa, Gulmi, Magdi, Baglung, Kapilbastu, Rupendahi
7.	Backward Society Education (BASE-Nepal)	Rukum, Salyan, Rolpa, Pyuthan, Dang, Dolpa, Argakhanchi
8.	Association for Social Transformation and Humanitarian Assistance (ASTHA) Nepal	Humla, Mugu, jumla, Jajarkot, Banke, Kalikot, Dailekh, Surkhet, Bardiya
9.	Rural Development Service Centre (RDSC)	Dadeldhura, Baitadi, Darchula, Doti, Bajhang, Bajura, Achham, Kailali, Kanchanpur
10.	Gramin Urja Tatha Prabidhi Sewa Kendra Pvt. Ltd. (RETSC)	Throughout the nation
11.	Biogas sector Partnership-Nepal (BSP) and Nepal Biogas Promotion Association (NBPA)	Throughout the nation

Annexe-3: Attendance of focus group discussion

Focus group discussion

Bhadra 8, 2071, Damauli, Tanahun

S.N.	Name	Organisation	Email	Phone	Signature
1	Bijaya Wagle	RSC/RESDTN	bijaya_wagle@yahoo.co.in	9849209360	
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10	शिव शर्मा शर्मा	"			
11	Ajay Kc Jha	Multiscope Consultancy P. Ltd.	jayajkumar@live.com	9841323147	
12	Hari Bahadur Bhandari	Multiscope Consultancy P. Ltd.	haridaslami@gmail.com	9851104134	

Focus group discussion

Bhadra 11, 2071, Kathmanu

S.N.	Name	Organisation	Email	Phone	Signature
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Annex-4: Photographs



Photograph of focus group discussion in Damauli Tanahun



Photograph of focus group discussion in Buddhanagar, Kathmandu



Photograph of focus group discussion in Buddhanagar, Kathmandu



Photograph of focus group discussion in Buddhanagar, Kathmandu