Innovative Finance For Renewable Energy Solutions

SNV

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Acronyms

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Centre
AMC	Advance Market Commitments
CCTs	Conditional Cash Transfers
CDM	Clean Development Mechanism
CECI	Canadian Center for International Studies and Cooperation
CEDB	Clean Energy Development Bank
CERs	Certified Emission Reductions
COD	Cash-on-delivery Aid
CIF	Climate Investment Fund
CREF	Central Renewable Energy Fund
CTF	Clean Technology Fund
DCGC	Deposit and credit guarantee corporation
DDF	District Development Fund
DFID	Department for International Development
DGIS	Directorate-General for International Cooperation
DSL	Deprived Sector Lending
EnDev	Energizing Development Programme
ESAP	Energy Sector Assistance Programme
ESCO	Energy Services Company
EU	European Union

FI	Financial Institutions
FSP	Financial Service Provider
GACC	Global Alliance for Clean Cookstoves
GAVI	Global Alliance for Vaccines and Immunization
GEF	Global Environment Facility
GHG	Greenhouse Gases
GIZ	DeutscheGesellschaftfürInternationaleZusammenarbeit
GoN	Government of Nepal
HH	Household
ICS	Improved Cooking Stoves
IEA	International Energy Agency
IFC	International Finance Corporation
IGAs	Income Generating Activities
IPP	Independent Power Producer
IVA	Independent Verification Agent
JCM	Japanese Joint Crediting Mechanism
JI	Joint Implementation
KfW	German Development Bank
LDCs	Low Development Countries
LFI	Local Financial Institution
LPO	Local Partner Organization
MFI	Micro Finance Institution
MFDB	Micro-finance Development Banks

MHP	Micro Hydro Project
MoF	Ministry of Finance
MOU	Memorandum of Understanding
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Actions
NCDB	National Co-operative Development Bank
NGO	Non-Government Organization
NRB	Nepal Rastra Bank
NRREP	National Rural and Renewable Energy Programme
OBA	Output-Based Aid
OBD	Output-based Disbursement
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PBF	Performance-based Financing
PV	Photovoltaic
PoA	Programme of Activities
PPP	Public Private Partnership
RBF	Results Based Financing
RMD	Rural Mutual Development
RE	Renewable Energy
REAP	REDD+ Energy and Agriculture Programme
RETs	Renewable Energy Technology

REDD	Reduced Emission from Forest Deforestation and Degradation
RERL	Renewable Energy for Rural Livelihood
ROI	Rate of Interest
RMDC	Rural Micro-credit Development Center
RSRF	Rural Self Reliance Fund
SACCO	Saving and Credit Co-operative
SAFAL	Sustainable Access to Finance and Livelihoods in Nepal
SEEP	Super Energy-efficient Equipment Programme
SFCL	Small Farmers Co-operative Limited
SFDB	Small Farmers Development Bank
SHS	Solar Home System
SIB	Social-impact Bond
SNV	Netherlands Development Organisation
SREP	Scaling Up Renewable Energy Programme in Low Income Countries
TA	Technical Assistance
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	US Agency for International Development
VDC	Village Development Committee
VSBK	Vertical Shaft Brick Kiln

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Preface

There is a widespread recognition that renewable energy finance needs to be scaled up from its current levels. However, there is still a big gap in developing a clear business model or financing model on how developing countries like Nepal can efficiently and effectively mobilise further financial resources and to meet growing energy needs from new and innovative sources of financing.

While the demand for renewable energy technologies keeps growing, the cost of such devices remains an important barrier for a majority of households and small businesses, slowing down their potential dissemination in developing countries, especially hurdles in reaching to bottom of the pyramid.

Seeking to overcome this barrier, SNV Netherlands Development Organisation has recently become involved in the development and implementation of an innovative financing mechanism through a pilot for renewable energy solutions in partnership with the Clean Energy Development Bank (CEDB) Nepal and Scott Wilson Nepal.

As an outcome of this study on innovative financing mechanism and subsequent pilot work, SNV, CEDB and Scott Wilson Nepal has designed a range of innovative financing mechanisms for the renewable energy sector with a particular focus on the domestic cooking and lighting markets. Key activities under this study involve conducting field based assessments to understand renewable energy users' perceptions and preparedness for new financing mechanisms, and evaluating the applicability and readiness of various result based financing instruments in the domestic cooking and lighting markets in Nepal.

I am happy to note that this publication has also explored how scale-up and replication of effective finance interventions efficiently mobilise private, public and development finances in the renewable energy sector.

I am sure that this publication will be highly useful as a reference document for renewable energy experts and banking fraternity involved in renewable energy technology promotion in Nepal.

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Executive Summary

Innovative financing has not been widely applied in the energy sector. However, of late, international energy initiatives like Sustainable Energy for All [SE4ALL] has highlighted the importance of innovative financing for achieving Sustainable Energy for All's objectives. The SE4ALL estimated that approximately USD 500 to USD 1200 billion of additional capital per year will be required to meet the objectives of the SE4ALL and hence resourceful solutions that promote the use of innovative finance to mobilize and leverage public and private capital are needed in order to positively transform the world's energy systems.

The International Energy Agency (IEA) has reported in its recent Global Energy Demand Report that the world requires USD 48 trillion investment till 2035 in order to meet the growing need for energy. To meet this increasing energy demand, countries need to diversify sources of energy production and means of energy distribution and countries must invest USD 40 trillion in energy supplies over the next 21 years, according to the same report of IEA. Economic growth and rising living standards have been fuelling the global energy demand, forcing governments to find ways and money to increase supplies. The world has invested USD 1.6 trillion in 2013 for energy supply, more than double the amount in 2000. Until 2035, the annual investment figure is expected to reach USD 2 trillion, report says.

In the recently published Global Status Report on Renewable 2014 it is stated that that total investment in renewable power and fuels (excluding large hydro-electric projects) fell for the second year running in 2013, reaching USD 214 billion worldwide, some 14%

lower than in 2012 and 23% below the 2011 record. That means, there is a significant gap between financing need and the existing financing, which is more than USD 50 billion investment gap (23% of the USD 214 billion).

In this context, the key question is- where from such a big investment can be generated to meet the growing needs of financing, while the global economy is affected with financial crisis? Indeed, this difficult situation has stimulated increased interest in innovative financing to help deliver more and better aid.

This publication includes an analysis of the need for innovating financing, which could be linked to the renewable energy sector, a critical review of existing and possible mechanisms and a proposed selection of avenues for the development of such mechanisms on the basis of literature review, meetings with relevant professional actors. The report presents two large categories of innovative financing mechanisms namely 1) Mechanisms for generating new resources 2) Mechanisms for catalyzing private investment. The idea is not to push for a single mechanism but to encourage the development of multiple options on the basis of global, regional, bilateral, national or local initiatives.

To validate the analysis on plausible innovative financing instruments, the report has reviewed it in the context of financial environment and renewable energy sector development in Nepal. The findings of this review are presented as a case study.

It is expected that this publication will be useful for development practitioners, financial experts and renewable energy professionals, which can be used as a reference tool for introducing innovative finance aspect in their country renewable energy programs.

CHAPTER 1
INTRODUCTION

1.1. Introduction

Financing Green Growth: Current Scenario

In the recently published Green Investment Report (2013), the World Economic Forum identified that the investment required for the renewable energy, power, water, agriculture and forestry sectors under current growth projections is approximately USD 5 trillion per year until 2020. The report has highlighted that there are additional investment needs of at least USD 0.7 trillion per year to meet the climate challenge. This is needed for clean-energy infrastructure, sustainable and low-carbon transport, energy efficiency in buildings and industry, and for forestry, to limit the global average temperature increase to 2°C above pre-industrial levels. In other sectors, incremental investment needs are unknown and more work is needed to understand these. Estimated separately, the additional investment requirements beyond current spending for adapting to climate change are estimated at USD 0.1 trillion per year in a 2°C scenario.

In a separate study on the global trend in renewable energy investment, the Frankfurt School of Finance & Management gGmbH reported that total investment in renewable power and fuels (excluding large hydro-electric projects) fell for the second year running in 2013, reaching USD 214 billion worldwide, some 14% lower than in 2012 and 23% below the 2011 record (Figure.1). That means, there is a significant gap between financing need and the existing financing, which is more than USD50 billion investment gap (23% of the USD 214 billion).

FIGURE 1. GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY BY ASSET CLASS, 2004-2013, $BN

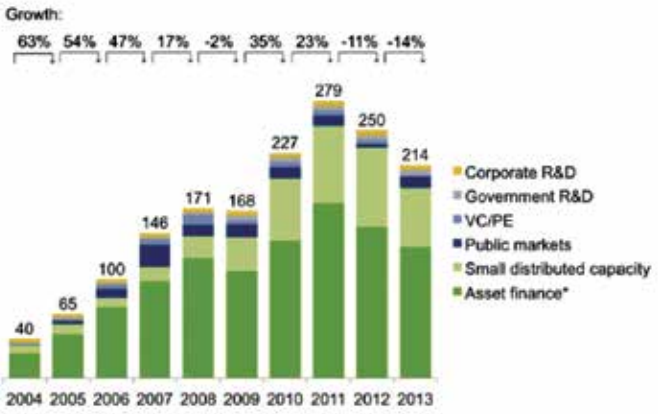


Figure. 1

*Asset finance volume adjusts for re-invested equity. Total values include estimates for undisclosed deals

Source: UNEP, Bloomberg New Energy Finance

Similar findings are also noted in the recently published Global Status Report on Renewable 2014, which has presented that new investment in renewable power and fuels—(not including hydropower projects >50 megawatts (MW))—is estimated as USD 214.4 billion in 2013, down 14% relative to 2012 (Figure.2). This second consecutive year of decline in investment—after several years of growth—was due in part to uncertainty over incentive policies in Europe and the United States, and to retroactive reductions in support in some countries. Europe's renewable energy investment was down 44% from 2012. The year 2013 also saw an end to eight consecutive years of rising renewable energy investment in developing countries. Yet the global decline also resulted from sharp reductions in technology costs. This was particularly true for solar PV, which saw record levels of new installations in 2013, despite a 22% decline in dollars invested.

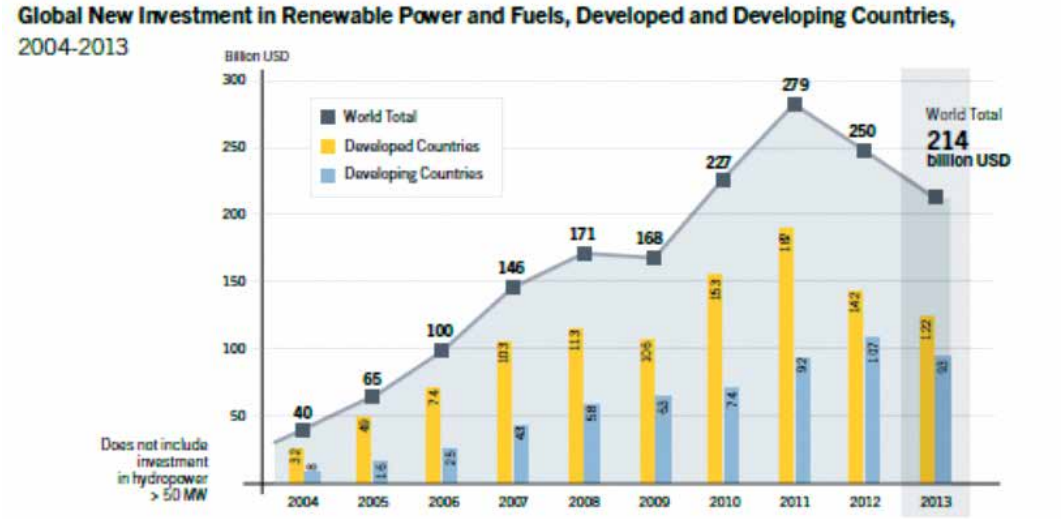


Figure. 2

In this context, the key question is- where from such a big investment can be generated to meet the growing needs of financing, while the global economy is affected with financial crisis? Indeed, this difficult situation has stimulated increased interest in innovative financing to help deliver more and better aid. But just what does "innovative financing" mean?

1.2. What is innovative finance?

There is no internationally agreed definition of innovative financing for development. A recent World Bank report[1] applies a definition based on sources of funding (i.e. mobilise public or leverage private resources) and the uses they support (public or private):

Using this definition, the World Bank estimates that "innovative fund raising generated USD 57.1 billion in official flows between 2000 and 2008" and that of this "alternative sources of concessional flows including solidarity levies and contributions represented USD 11.7 billion". The larger figure includes items that many may not regard as innovative financing, such as aid extended by emerging donors (USD 10.7 billion), and local currency bonds issued by the multilateral development banks (USD 40 billion in 2000-08). The numbers are much smaller if one limits consideration to the Bank's categories of solidarity levies (USD 1 billion over 2000-08), catalytic mechanisms such as carbon finance (USD 1.6 billion) and PPPs (USD 3.6 billion).

> Innovative financing involves non-traditional applications of solidarity, PPPs, and catalytic mechanisms that (i) support fund-raising by tapping new sources and engaging investors beyond the financial dimension of transactions, as partners and stakeholders in development; or (ii) deliver financial solutions to development problems on the ground.

In another definition, which is a more normative description of innovative finance, says that such financing should: be additional, or complementary to ODA and not substitutive to it and the financing trend should be predictable and stable over time through multi-year commitments and, new taxes or other permanent basis for funding and comply with the principles of the 2005 Paris Declaration on Aid Effectiveness and the 2008 Accra Agenda for Action.

1.World Bank (2009), Innovating Development Finance: From Financing Sources to Financial Solutions.

For the purposes of this study, we consider innovative financing to comprise mechanisms of raising funds or stimulating actions in support of international development that go beyond traditional spending approaches by either the official or private sectors, such as:

- new approaches for pooling private and public revenue streams to scale up or develop activities for the benefit of partner countries;
- new revenue streams (e.g. a new tax, charge, fee, bond raising, sale proceed or voluntary contribution scheme) earmarked to developmental activities on a multi-year basis;
- new incentives (financial guarantees, corporate social responsibility or other rewards or recognition) to address market failures or scale up ongoing developmental activities.

Some view innovative sources of development finance as a natural and pragmatic response to the consistent failure of most donors to devote sufficient funds to international development. For others, innovative financing for development initiatives are simply representative of the important shift in the way development partners do business. This shift,— which has been increasingly evident for some time — is founded on a reduced role for ODA and a much larger role for the private sector in development. This is combined with technological progress and innovations in financial engineering which have changed the landscape for mobilizing resources from the state, to the private sector and citizens.

Hence, there is no internationally agreed definition of 'innovative financing for development'. In reality, the term encompasses a heterogeneous mix of innovations in fundraising and innovations in spending, i.e. innovative financing for development comprises both innovations in the way funds are raised as well as innovations in the

ways funds are spent on international development (World Bank 2009).

Interestingly, in a study of UNDP[2], it is identified that there could be four broad categories of innovative finance mechanisms, which comprises the below categories:

1. Taxes, dues or other obligatory charges on globalized activities: This includes initiatives such carbon tax and carbon finance which is developed at the national level but within a framework of international coordination like UNFCCC. The revenues raised are allocated to international development.

2. Voluntary solidarity contributions: Under such initiatives, consumers are given the option to donate a small sum to international development at the point of product purchase (e.g. carbon footprint while booking airline ticket). Although private in nature, public authorities facilitate such contributions through tax incentives and technical facilitation in the distribution of resources.

3. Frontloading and debt-based instruments: An initiative which 'frontloads' resources makes public funds available earlier for development. It does this via the issuance of bonds on international capital markets. Mechanisms which 'frontload' public resources for development generate liabilities that is reportable as aid in several years' time, i.e. when the liabilities fall due. Other debt-based mechanisms include debt conversions (which reduce the amount of debt and debt service payable thereby freeing-up additional resources for development expenditures), diaspora bonds (a debt instrument—issued by a country, a sub-sovereign entity or a private corporation—to raise financing from its overseas diaspora) and socially responsible or 'green' bonds (bonds which target investors who wish to invest in development or environment initiatives and so may accept lower rates of return on their investments).

2. Innovative Financing for Development: A New Model for Development Finance; UNDP, 2012

4. State guarantees, public-private incentives, insurance and other market-based mechanisms: This includes initiatives which leverage public funds to create investment incentives for the private sector, for instance through state subsidies or commitments to purchase a particular product at a set price (e.g. a vaccine). In doing so, these initiatives aim to correct market failures. Other mechanisms aim to reduce sovereign risk and/or macroeconomic vulnerabilities, for instance weather-based insurance or counter-cyclical loans (i.e. they aim to improve the effectiveness of finance rather than create new revenue streams for development).

The distinction between innovative sources of finance for development (which relates to how funds are raised, e.g. through a coordinated international tax) versus innovations in the ways resources are delivered (e.g. though countercyclical loans) is crucial. Therefore, this publication has presented a few (selected) frameworks on innovative finance to the practitioners, particularly, focusing on renewable energy sector so that a suitable framework can be adopted by practitioners for developing renewable energy programs.

1.3. Renewable Energy and Innovative Finance

The International Energy Agency (IEA) has reported in its recent Global Energy Demand Report that the world requires USD 48 trillion investment till 2035 in order to meet the growing need for energy. To meet this increasing energy demand, countries need to diversify sources of energy production and means of energy distribution and countries must invest USD 40 trillion in energy supplies and USD 8 trillion in energy efficiency over the next 21 years, according to the same report of IEA. Economic growth and rising living standards have been fuelling the global energy demand, forcing governments to find ways and money to increase supplies. The world has invested USD 1.6 trillion in

2013 for energy supply, more than double the amount in 2000. Until 2035, the annual investment figure is expected to reach USD 2 trillion, report says.

There is a widespread recognition that type of financing needs to be scaled up from its current levels to meet the increasing needs of investment. However, there is no clear view on how developed countries can efficiently and effectively mobilise further financing in addition to the currently available mechanisms of financing to meet the needs of developing countries. Although, developed countries have committed to mobilise USD 100 billion per year of climate finance for developing countries by 2020 from a variety of sources (these include both public and private finance), there is also a need to explore for other sources of innovative financing at domestic and international level.

As of now, non-conventional and innovative means of financing is evident only in the health sector. Innovative financing is not yet happened in renewable energy sector. There are three major health-related innovative financing mechanisms in existence today, viz., UNITAID and the solidarity contribution on airline tickets, the IFFIm/GAVI and the Advance Market Commitment for pneumococcal vaccines.

UNITAID, which is primarily financed by a very small levy on airline tickets, is a drug purchase facility intended to make HIV/AIDS, malaria and tuberculosis treatments more affordable. It works in partnership with other organizations to purchase drugs, distribute them and negotiate large price reductions. The IFFIm is a very large facility funded by government-guaranteed bonds issued on international capital markets. The funds raised are used to establish the most urgently needed immunization programmes in the poorest countries. The Advance Market Commitment for pneumococcal vaccines is a pilot project based on a partnership contract between donors and pharmaceutical companies. It ensures that research on pneumococcal vaccines moves forward and that, once the

research is completed; the vaccines will be sold at prices that the target population can afford.

In this UNITAID initiative, more than 1.7 billion dollars have already been raised. Nearly 1.2 billion dollars were raised in the first IFFIm bond issues and UNITAID has committed more than 500 million dollars. In addition to these funds, 1.5 billion dollars have been put up under the Advance Market Commitment (AMC) for pneumococcal vaccines.

The success of innovative financing in the health sector provides a good learning platform for development organizations to introduce this mechanism into the renewable energy and other sectors. In the context of this study, therefore, a range of instruments of innovative financing that relate to renewable energy are identified and discussed in the subsequent sections.

1.4. Plausible Innovative Finance framework for RE sector

The World Bank estimates that Innovative fund-raising generated an estimated USD 57.1 billion in official flows between 2000 and 2009 (World Bank, 2010). The Leading Group on Innovative Financing for Development, which focus on a narrower set of innovations in financing for development, estimates that USD 5.5 billion has been raised in total so far for health through schemes such as the airline ticket tax and the International Finance Facility for Immunization (Leading Group, 2011). Under the OECD definition of innovative finance, USD 31.3 billion has been raised between 2002 and 2011 for climate and the environment, the vast majority through carbon emissions trading under the Kyoto Protocol (USD 28 billion) (United Nations, 2011).

Out of these three key sources of information on innovative finance, only the OECD's estimation is directly linked to the renewable energy sector as part of the carbon emission trading is assumed to be generated from deployment of renewable energy technologies. Unfortunately, the potentiality of innovative finance in the renewable energy sector is not yet established and therefore, this current study is a pioneering work which aims to provide, while not exhaustive, an overview of some of the major innovative finance instruments, which can be applied for financing renewable energy initiatives.

a. Stimulating private-capital flows

Private capital is an enormous source of global wealth that has not historically played as significant a role in development as its scale would suggest. This is not for lack of interest. Private capital is constantly seeking investment opportunities [3]. However, it only commits to those prospects that meet its appetite for risk and reward. Due to a variety of factors, many opportunities in developing countries are often perceived as overly risky or uncertain for the majority of investors. Institutions that offer to guarantee portions of loans made for such investments help investors rebalance their assessments of risk and reward and subsequently unlock considerable capital into developing countries. For example, in the past decade, the World Bank has approved 28 guarantees worth a total of USD 1.4 billion. These guarantees have stimulated more than five dollars of private capital for every dollar spent by the World Bank[4]. Yet this type of support remains a very small portion of the bank's approach to financing in developing countries. Since the G20 summit in London in 2009, multilateral development banks have stepped up efforts to do a better job of leveraging private capital. There is an opportunity for the G8, the G20, or individual governments to use their influence and encourage multilateral

3. For more, see the full McKinsey Global Institute report, Financial globalization: Retreat or reset?, March 2013.
4.Innovative Finance for Development Solutions: Initiatives of the World Bank Group, World Bank, 2010, worldbank.org.

development banks—and potentially bilateral agencies—to create innovative instruments that stimulate private flows. Since guarantees may be more difficult to get through national budget processes than traditional financing, a starting point could be to work on ways to address these institutional barriers.

One potential way for private capital to contribute to development is by fuelling the growth of small and medium-size enterprises (SMEs) in developing economies. Such companies are often underfunded in these regions because they typically are too small for commercial lending but too large for microcredit financing. There could be an opportunity for multiple players to collaborate in the creation of a set of financial instruments to serve this segment. Local commercial banks could provide the capital and deliver the funds when sharing some of the risk with large multilateral organizations or major foundations that provide first-loss guarantees. Donors could play a role in funding pilot programs or supporting demand-side capacity-building initiatives such as credit-scoring initiatives or skill building for entrepreneurs.

Application to RE sector:

In last few years, the large and growing investments in clean energy infrastructure (primarily renewable energy), the private sector already accounts for the vast majority of climate-friendly investments. HSBC, the British multinational banking and financial services company, estimates that, during the decade 2010–2020, there will be USD10 trillion in cumulative capital investments in the low-carbon energy market globally, or about USD 1 trillion per year (HSBC, 2010). Hence, flow of private sector funding into the renewable energy sector is emerging, although financing modality of private sector funding could be different from country to country (asset management, equity, venture capital, hedge fund, pension fund etc.) and investment decisions are shaped

largely by the profit motive, and rarely subject to other criteria such as environmental or development objectives. For instance, Cleantech Energy Group, an asset management company, established in 2008 focuses on investments in the cleantech energy sector. This group now advises on renewable energy strategies across diverse asset base. And has USD 205 billion in assets under management, of which USD 50 billion is allocated to private equity (Towers Watson, 2012). Therefore, there is great potential for investment in renewable/clean energy sector, and if the appropriate investment climate exists, and risks can be adequately mitigated, the private sector is well positioned to allocate the additional capital required.

b. Social-impact bond (SIB)

A new form of multi-stakeholder partnership intended to leverage private capital for scaling solutions to social problems is the social-impact bond (SIB). In a SIB, philanthropic funders and impact investors—not governments—take on the financial risk of expanding a proven social programs. Nongovernment organizations deliver the social program to more people who need it; the government pays only if the program succeeds.

In the absence of SIBs, philanthropic donors fund pilots that demonstrate the efficacy of preventive programs, but then these programs—even though they work—are not expanded to the entire population that needs them. This is because only government has the reach and the resources to provide the multi-year funding required for scale-up. For their part, governments' existing systems tend to focus on remediation, and fiscal constraints can make it tough for them to introduce alternative approaches. However, SIBs can facilitate the critical handoff from philanthropy—which provides the "risk capital" of social innovation by funding and testing new programs—to government, which has

5. http://www.cse.org.uk/downloads/file/fuel_poverty_social_impact_bonds.pdf

both the capital and policy influence to take programs to scale. Since SIBs are a very new idea, all the potential applications have not been fully explored. However, SIBs appear best suited for behavior-change programs requiring intense case management and integrated assessment to ensure quality of SIB program. To date, the social-impact bond is being piloted in the United Kingdom in the criminal-justice field. In the United States, New York City and the Commonwealth of Massachusetts recently announced plans to launch SIBs in the area of juvenile justice; Massachusetts also plans to launch an additional SIB to combat homelessness. The Center for Global Development is exploring how SIBs can be applied in international development. In the field of renewable energy, SIBs have not yet been tried.

Application to RE sector:

Social Impact Bond is yet to come into practice in renewable energy sector. However, by considering the strong 'social and environment impact' component of SIB, it is understood that SIB will not be very difficult to integrate with the deployment of renewable energy technologies. For instance, the Centre for Sustainable Energy (CSE), UK has tried to apply SIB in the fuel poverty sub-sector and aims to examine the feasibility and desirability of SIBs as a funding instrument for fuel poverty alleviation activities, exploring the required technical, financial and institutional arrangements[5].

In renewable energy sector, technologies like improved cookstoves could be a good fit for SIB as it has potentiality of reducing indoor air-pollution and capacity to enhance health benefits to rural/poor households. The following table outlines a simplified, hypothetical Social Impact Bond (SIB) for cookstove sector:

Table. 1

Stakeholder	Actions
Private sector	Invests USD 5 mm in SIB with a 5-year term and 10% target reduction in indoor air-pollution by introducing improved cookstoves to rural/poor households
Not for profit sector (like SNV)	Receives USD 5 mm of capital to facilitate reduction in the indoor air-pollution by introducing improved cookstoves to rural/poor households over 5-year period
Government	Pays investor USD 5 mm +/- a financial return (or interest payment) at end of 5-year term. Payment is set forth in the contract and based on the reduction indoor air-pollution by introducing improved cookstoves. For example, a reduction in indoor air-pollution by 10% or more may earn the investor a financial payment that equates to an 8% annualized return.

This hypothetical "5-year SIB" would have the following benefits for contracting entities:

Private sector	Investment return and "impact" on reduction indoor air-pollution by introducing improved cookstoves.
Not for profit sector (like SNV)	Upfront capital infusion, which reduces the need to fundraise
Government	Potential for cost savings versus current government programs, capacity building to scale more effective homeless treatment, and lower costs and lower risk versus current government programs

c. Encouraging private voluntary contributions through matching funds

Governments are in a unique position to encourage large amounts of voluntary contributions from private corporations and citizens by setting up matching programs. They are distinguished in having the credibility to intervene on social issues in a fair and responsible way, as well as the resources to implement matching programs at manageable scale. For example, in 2010, the Canadian government set up a Pakistan Relief Fund that raised USD 47 million from individual citizens over a two-month period. This was based on a promise that the Canadian International Development Agency would match all citizen contributions of up to USD 100,000 each. The resulting total that went to the relief effort (USD 94 million) was almost five times some of the best-performing corporate matching campaigns. Government matching programs not only mobilize new resources but also, almost more importantly, engage a broader set of players in sharing the responsibility for global development. The GAVI Alliance (formerly the Global Alliance for Vaccines and Immunization) put in place an effort to raise a total of USD 260 million by 2015, with pledges from the UK government and the Bill & Melinda Gates Foundation to match a total of about USD 130 million in contributions from private corporations, foundations, and citizens.

Application to RE sector:

Countries could commit to establishing a national renewable energy fund that matches commitments from corporations and individuals up to a pre-specified limit on providing access to clean cooking and lighting. Corporations, in addition, can contribute their own funds, could employ innovative means to engage and raise funds from their customers. Governments could identify priority development topics and select eligible private-sector recipients for challenge-fund proceeds. The most powerful partnerships would be

ones where private-sector energy companies (players) could also contribute their core capabilities beyond straight financing, such as having telecom companies offer solutions based on mobile technology.

d. Concessional Lending

The up-front transfer or resources from one party to another with the agreement that the money will be repaid on conditions more favourable than market terms is known as concessional or soft lending. This lowers the cost of capital and reduces the risk to all participants by offering low or no interest rates, longer repayment and/or grace periods, or a combination of these features. Intrinsically, concessional lending includes a grant component that can be quantified based on how favourable the lending terms are (the "grant element" of the loan). Concessional lending is used when financing at market terms is not available or would make the investment unviable. In the absence of concessional funds, the resulting cost increase might create pressure on fiscal subsidies, burden consumers if additional costs are passed on to them via prices or tariffs, or make projects or programmes unviable. Concessional lenders generally consider the existing debt levels and capacity to repay of the loan recipient before extending financing to borrowers.

Application to RE sector:

Concessional lending is used when market financing would make the investment unviable and in the context of banking systems of developing countries, it can encourage local banks to enter the lending market for energy efficiency and renewable. An example of concessional lending is the IADB loan to Trinidad and Tobago to strengthen and modernize the regulatory, institutional and policy framework to develop and promote instruments to assess and reduce vulnerability and risks associated with climate change

and to promote carbon markets and policies to reduce greenhouse gas (GHG) emissions.

Under the Scaling Up Renewable Energy (SREP) Program of the Climate Investment Fund (CIF), a facility of concessional loan was introduced in 2013, targeting to promote hydro-electricity and other commercially viable renewable energy technologies.

e. Guarantees

Some investments entail inadequate risk-adjusted returns to investors or governments and fail to attract capital through debt on terms that could ensure the feasibility of the project. Guarantees help to mitigate or manage such risks. Guarantee instruments are commitments in which a guarantor undertakes to fulfil the obligations of a borrower to a lender in the event of non-performance or default of its obligations by the borrower, in exchange for a fee. Guarantees can cover the entire investment or just a portion of it.

Risk mitigation instruments focus on reducing key default risks at various points in the financing cycle. They can help mitigate specific counterparty risk in a project or provide cover from changes in policy or regulatory frameworks. They can help address project-specific increases in operations and maintenance costs above estimates and where the operator has refused to guarantee additional cost coverage because of a new technology, or degradation of performance beyond the operator's guarantees.

The IFC has been using GEF grant funding to support financial institutions with guarantees in seven countries (Brazil, Colombia, Guatemala, Mexico, Russian Federation, South Africa and Thailand), with partial credit guarantees in order to provide financing to various segments, including residential, commercial, municipal and energy supply. Over time, the guarantees from the IFC can be phased out as familiarity with these sectors improves and risk perceptions decrease. This form of guarantee allows leveraging

USD 12-15 of commercial investment for each USD in GEF funds, when effectively structured.

Application to RE sector:

Importance of guarantee fund in renewable energy sector is widely accepted. Of late, the U.S. Energy Department unveiled a plan for up to USD 4 billion in loan aid for renewable energy companies to help rejuvenate a renewable energy program that faced harsh political attacks over past failures of federally subsidized projects. It will specifically focus on advanced electric grid technology and storage, biofuels for conventional vehicles, energy from waste products and energy efficiency.

f. Equity investments

Some projects have significant risks and financial requirements that investors are not necessarily willing to take. In such cases, it is possible to make equity investments, which directly inject capital to grow the operation of a project or a firm and allow it to leverage further resources, as they mitigate the risk for other investors. Equity investors own part of the company or assets and therefore depend on the results of the project to secure a financial return on their investments; they do not have any guarantee of repayment or return. In the case of failure of a project, the debt holders involved in the project have priority on any available returns over the equity investors. Equity is used when the probability of failure of the investment is high, but there still remains a probability of success and, therefore, of return to the equity holder.

An example of equity investments is the IFC/GEF Photovoltaic Market Transformation Initiative designed to accelerate the sustainable commercialization and financial viability of energy services, based on solar electricity technology, in India, Kenya and Morocco.

It is important to note that two or more instruments can be blended, with more than one instrument being used by the Fund itself on a particular project, or a Fund instrument or instruments being combined with instruments from other sources of financing.

Application to RE sector:

The bulk of funds needed to finance renewable energy in the world will need to come from the private sector, drawn in through various mechanisms and incentives put in place by government. Private equity, in particular, could help fill the vast funding gap in the renewable energy industry. Within the private financing arena, private equity and venture capital will play a pivotal role in responding to the various investment opportunities across emerging and maturing markets. Through making available this much-needed funding, the private equity industry will help drive the move towards a lower-carbon environment and contribute to environmental sustainability. Support for renewable energy – and energy in a broad sense – is particularly urgent across the globe where energy infrastructure has not kept pace with economic growth.

In a report, published by the PROPARCO'S MAGAZINE (Issue 6 - May 2010), it has been stated that although developing countries (DCs) hold the bulk of global renewable energy potential – especially for solar and biomass energy – they have not benefited from the same level of private investment as developed countries. Such investments remain two times lower, which can partly be explained by the cost of developing energy production technologies. Clean energy-focused funds are still reluctant to invest in DCs and prefer to concentrate their operations in certain emerging countries, such as India and China. Both renewable energies and energy efficiency in DCs consequently hold a truly "unexploited potential" for investors. The figure below provides an overview of private equity investment in clean energy financing in DCs.

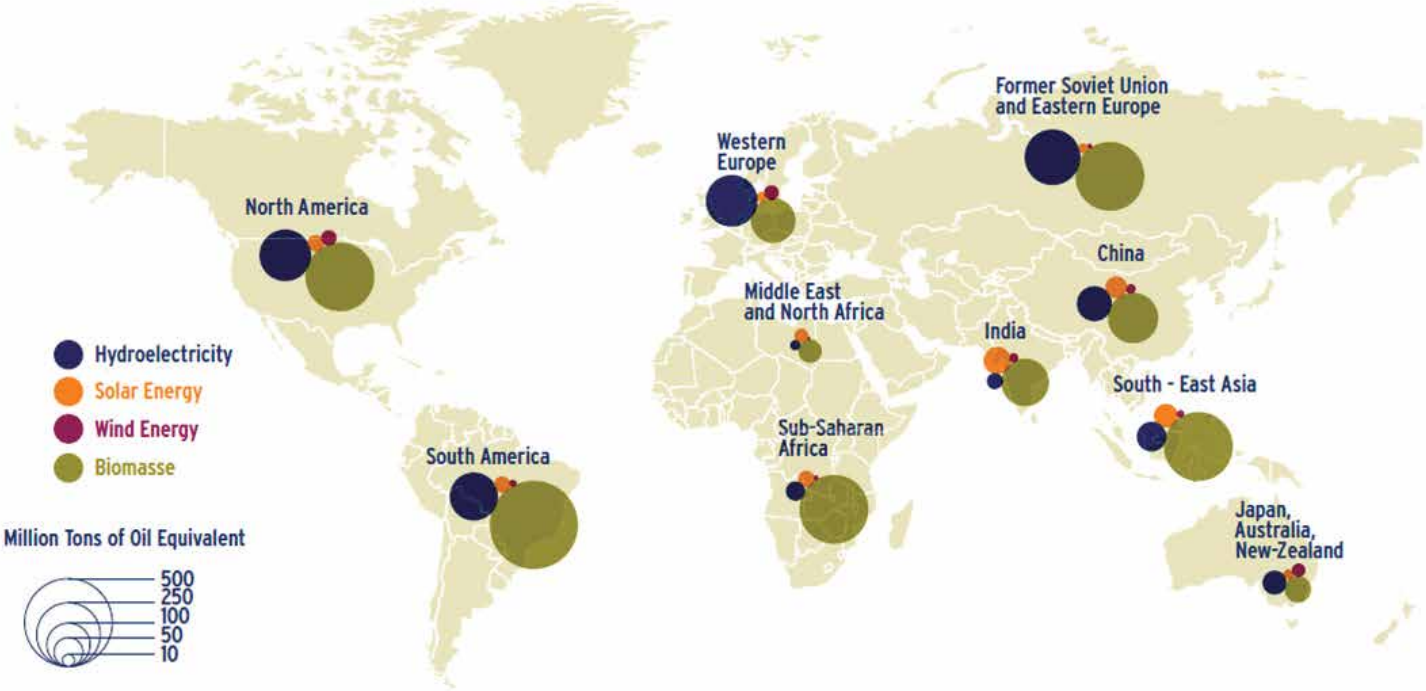


Figure.3: *Private Investment Potential in Renewable Energy Sector*

g. Concessional financing for waterfall payment mechanisms

In addition to subsidizing the cost of loans, guarantees or equity investments, concessional resources can also be used as risk buffers to cover first losses in waterfall payment mechanisms that assign the payment of revenues to senior risk tranches held by development finance institutions and private investors. Under such a structure, different risk tranches of capital are created, where the first loss may be covered by concessional sources and the upper tiers by development finance and commercial investors. A waterfall repayment mechanism assigns the first payment of revenues to the senior tranches and the last to the first-loss tranche. The use of concessional resources under this structure allows additional commercial funds to be leveraged at a large scale for development purposes. The risk buffers of the higher-risk tranches also provide significant comfort to more risk-adverse investors.

Application to RE sector:

This type of payment scheme works for an energy company repaying more than one loan. Assume this company has three operating loans, all with different interest rates. The company would make principal and interest payments on the more costly loan, and make only interest payments on the remaining two loans. Once the more expensive loan is paid off, the company can make all interest and principal payments on the next, more expensive loan. The process continues until all loans are repaid.

This mechanism of waterfall payment is very much suitable for the renewable energy sector. However, development organisations like SNV can't use this mechanism without a private sector partners. The ideal scenario, where waterfall payment mechanism can be used is working with manufacturers of renewable energy technologies, who could use its payment schemes based on differential rate of interest and SNV could merely play of supporting role in providing access to supply chain of RETs to manufacturers.

h. Debt swaps

Debt conversion or debt swaps occur when an existing debt stock or stream of debt service payments is converted into another obligation or type of asset. Usually a debt swap involves the voluntary exchange of a debt instrument by a creditor with its debtor for cash, another asset, or a new obligation with different repayment terms.

This type of scheme has been used for environmental funding through debt-for-nature operations. Such swaps often involve a third party, such as a non-governmental organization (NGO), which buys the debt from the creditor at a discount. In turn, the NGO uses the debt for payment in local currency in exchange for the debtor agreeing to fund certain environmental activities. Another debt swap modality involves the creditor and debtor transacting directly in relation to bilateral debt. In these cases, the creditor cancels out all or a portion of the debt and the debtor agrees to use the amount of the cancellation to fund mutually agreed environmental activities.

Why should an NGO be interested in carrying out such a relatively complicated operation as a debt for-development swap? There are two possible motives, each distinct from the other.

- The NGO may find that a debt-for-development swap will provide it with more in local money for its foreign currency than it would get across the bank counter. A swap may thus be good business.

- The NGO may be concerned with the devastating effects the foreign debt is having on the economy of the country where it works. Therefore its interest may be in helping to bring about debt reduction[6].

6. http://earthmind.net/parks/docs/debt-swaps.pdf

WHO GAINS?

A debt-for-development conversion or swap regularly involves three actors who all benefit from the difference between the nominal value and the real value (defined by the secondary market or some other mechanism) of a country's foreign debt. Figure.4 shows the three values involved.

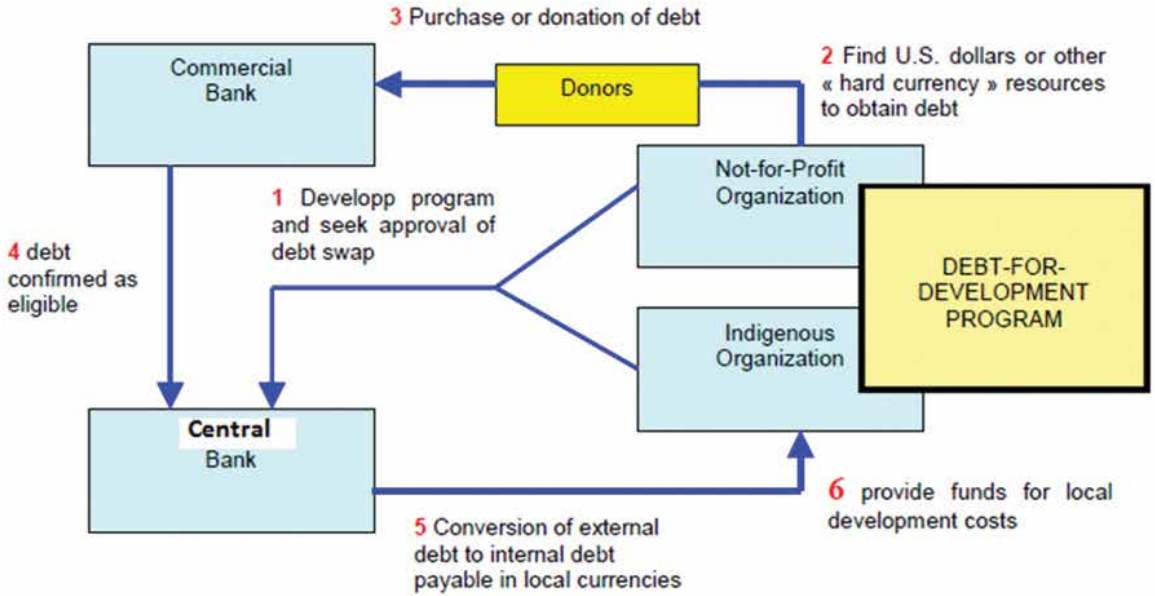
As illustrated in the Figure.4, the creditor's gain is equal to (b), provided the original debt is considered uncollectable. Through the conversion the creditor realizes a percentage of the original claim (a). Otherwise this claim would only have caused more and more arrears to build up which the creditor would never be able to collect. The creditor will make the decision to sell at a given price dependent on an analysis of the debtor's future ability to pay in full or at a higher rate than the actual offer.

The debtor government gains the difference between prices (a) and (c) or between (a) and (d). It will make its decision on the deal dependent on various factors which are discussed more in detail below:

The rate of other kinds of debt cancellation available from its international creditors, the priority it gives to the NGO's proposed programme or project, its own capacity and willingness to service its debts in the future, etc.

The purchasing NGO gains the difference between prices (b) and (c) or between (b) and (d). It will enter the transaction provided:

- it can ensure payment by the debtor government with a sufficient degree of certainty;
- the price differences are high enough to offset the additional effort as compared to a
- simple currency exchange and possible risks caused by the debtor government's
- eventual inability to fulfil its payment obligations over time.



Source : The Debt for Development Coalition Inc. : How the International Debt Problem can work for Development (flyer) September 1993

Figure.4: *Debt Swap Mechanism*

Application to RE sector:

This innovative financing instrument can be used in the renewable energy sector as clean energy has a direct linkage with sustainable benefits. For instance, Norway provided grant funding through debt relief to assist Guyana to reduce its GHG emissions by avoiding the deforestation and forest degradation of rainforests and to shift away from forest-dependent employment and income generation. The Fund could utilize debt conversions for climate adaptation as an innovative financing mechanism that supports highly indebted poor countries and the most vulnerable small countries to devote additional resources for climate change adaptation efforts.

i. Performance-based payments

Performance-based payments refer to a grant or concessional loan that is disbursed in tranches against the verified fulfilment of predefined targets or quantified emission reductions in a project or programme. Payment is conditional on measurable actions being undertaken. This kind of financing is aimed at rewarding innovation and successful implementation of a project with clear climate benefits. In many instances, carbon credits or units may be seen as a special type of performance-based payment.

Performance-based finance can be used to promote policy reforms, build capacity and undertake investment projects. The Super Energy-efficient Equipment Programme (SEEP) in India, supported by the World Bank, is an example of this modality. SEEP commenced with a pilot phase in which approximately 5 million super-efficient ceiling fans will be introduced over a four-year project cycle. This programme will provide performance-based, sales-verified financing incentives to competitively selected manufacturers for producing fans that are at least 50 per cent more efficient than standard fans.

Application to RE sector:

There is good numbers of ongoing initiatives in the Performance-based payment or incentives in the renewable energy sector. For instance, paying a production incentives based on the number of kilowatt-hours (kWh) generated by a renewable energy system. A "feed-in tariff" is another example of this kind.

j.Public-private partnerships (PPP)

A PPP is a contractual agreement between a public agency and a private sector entity. Through this agreement, the skills and assets of each sector (public and private) are shared to deliver a service or facility. In addition to the sharing of resources, each party shares the potential risks and rewards associated with the delivery of the service and/or facility.

While many climate actions will continue to be undertaken by governments, the scale of the challenge means that governments cannot act alone, as they may not have adequate funds, skills or capacity. Also, some interventions may require long periods of implementation if they are delivered as public-only projects. Since public finance will be limited, multiple sources of finance, including private sector finance, can usefully be combined in different ways to deliver sustainable solutions. Such hybrid financing schemes are also more appropriate as projects become more complex and not viable purely on private financing structures, which makes a partnership between the two sectors in innovative ways desirable.

Application to RE sector:

PPP models can potentially address challenges in providing access to clean energy, adaptation and mitigation efforts in sectors such as housing, communication,

infrastructure, health, agriculture and water and sanitation. An example of a PPP is the Bulgaria Energy Efficiency Fund, in which the World Bank, the GEF and the Austrian Government, together with a private sector fund management consortium and local financial institutions in Bulgaria, joined efforts to create the combined capacity of a lending institution, a credit guarantee facility and a consulting company. They provided technical assistance to Bulgarian enterprises, municipalities and private individuals in developing energy efficiency investment projects and assisted their financing and co-financing and played the role of guarantor for other financing institutions.

k. Blending with finance from multilateral development banks, bilateral agencies and market sources

Blending the Fund's financial instruments with those of multilateral development banks (MDBs), bilateral agencies and market sources could be used in developing countries to enhance the terms of financing in order to make investments viable. Fund resources could be used to cover the incremental costs of the investments. The Clean Technology Fund (CTF) has many blending options to co-finance projects and programmes with MDBs. For example, it provided a concessional loan to the Government of the Philippines to help the country implement projects that will mitigate climate change by deploying low carbon energy technologies and encouraging energy efficiency measures for industry, commercial buildings and municipalities. These projects receive co-financing from the World Bank and the ADB's regular operations and also aim to mobilize additional financing from both the government and the private sector.

Application to RE sector:

This financial instrument has strategic fit with country's energy and infrastructure vision and facilities like the Climate Investment Fund (CIF) of World Bank, ADB and other multi-

lateral banks have provides highly concessional resources to countries to explore options to scale up the demonstration, deployment and transfer of low carbon technologies in renewable energy, energy efficiency and sustainable transport. The sub-sectors, covered under the renewable energy sector are: concentrating solar power, solar photovoltaic, geothermal, wind and small hydro power projects.

I. Advance market commitments (AMC)

An advance market commitment is a mechanism that generates incentives for private sector engagement by ensuring viable market demand. Thus, an advance market commitment could be aimed at creating a market for future technologies relevant to developing countries that are sufficiently large and credible to stimulate private investment into research and development and manufacturing capacity. In the context of climate change, the end goal would be to accelerate the availability and introduction of climate-friendly technologies to developing countries.

An advance market commitment requires sponsors to make legally binding financial commitments to support a market of a pre-agreed value. The technology's specifications are defined in advance with the participation of the developing country decision-makers. Participating firms commit to supply a successful technology at a pre-guaranteed price. The market price is thus guaranteed and the aggregate value or advanced market commitment sum is defined in advance. If the developing country does not order the product, the technology developer cannot start to draw down on the advance market commitment value. This creates incentives for technology developers to bring to market products with the specifications that developing countries are demanding. AMCs are temporary interventions to make revenues from markets more lucrative and more

6. https://energypedia.info/images/e/ef/Rwanda_AMCs_for_Rural_Energy.pdf

certain in order to accelerate investment. Some examples of AMCs include interventions like feed-in tariffs and renewable purchase obligations. However, it also encompasses more innovative policies. AMCs are 'demand-pull' measures that can be contrasted with 'supply-push' measures e.g. capital grants.

To date, this type of mechanism has been mostly used in the public health sector to encourage the research, development and production of vaccines against diseases that affect people in developing countries. The principles can be applied to other types of technology, such as low carbon energy, and could represent an important tool for funding low carbon technology development and transfer.

Application to RE sector:

DFID is leading a new initiative to explore how Advance Market Commitments (AMCs) or market-pull mechanisms could be used to drive private sector investment in low carbon, climate resilient technologies, such as renewable energy (DFID, 2010). As part of this initiative, DFID is currently implementing an AMC project in in Rwanda[7], which aims to demonstrate the wider potential of market-pull approached to supporting low carbon development, and to catalyze private sector investment in renewable energy projects such as biogas and off-grid micro-hydro power. The main barrier to the development of biogas and hydro power project in Rwanda was demand uncertainty.

AMCs are defined as "temporary intervention to make revenues from markets more lucrative and more certain in order to accelerate investment" and for the pilot project in Rwanda it was in the form of short term cash incentives. The AMC consists of one funding pot, to which biogas and hydro developers can access according to differentiated incentive criteria.

The incentive criteria was linked into the disbursement of funding and this was established with periodic monitoring, which was carried out by local banks. For biogas projects, it was anticipated that the AMC incentive will take the form of a yearly cash incentive on commissioning of the installation and for up to three years thereafter on condition that it is fully functioning. To receive the incentive, developers will need to demonstrate that each installation delivers biogas to a school or other community installation, and that a bilateral contract exists for the provision of biogas.

For micro hydro projects, the incentive could be paid in four instalments over three years according to some combination of the total number of household connections, the number of new connections added, and the power drawn per connection.

m. Results Based Funding (RBF)

RBF is a type of innovative finance which encompasses a range of mechanisms designed to enhance access to and delivery of infrastructure and social services through the use of performance-based incentives, rewards, or subsidies. In simple term RBF refers to mechanism where financing bodies makes payment only after the pre-agreed results or output has been achieved. Under the RBF a donor or a Government agency provides financial support, subject to the recipient undertaking a set of pre-determined actions or achieving a pre-determined performance or outputs. Funds are disbursed based on demonstrated and independently verified results. This also means that if results are not achieved, payment won't be made. There are several RBF instruments explored by different donor agencies. Some of these are: Output-based Aid (OBA), Output-Based Disbursement (OBD), Performance-Based Financing, Conditional Cash Transfers (CCT), Cash-on-delivery Aid (COD), Carbon finance, Vendor Financing against delivery etc. While RBF originally came as a financial modality used in the health sector, it is

increasingly becoming popular in other sectors such as infrastructure and in renewable energy and deployment of low carbon technologies.

The results-based relationships can be between various agencies, for example between a development agency and a government, between a government and a ministry, or between a national and a subnational government. The results under RBF operations can be outcomes, outputs, and system improvements that address sector performance bottlenecks. Many RBF operations use a combination of results at different levels. The design of RBF operations also stresses the importance of identifying the right results. Therefore, the results should be defined from the standpoint of the ultimate beneficiaries to ensure that results are relevant and meet their needs. Some of the RBFs instruments, which are applied in renewable energy sector, are discussed below.

Application to RE Sector:

I. Output-based Aid (OBA) is widely applied in the renewable energy sector. This RBF instrument is used to enhance access to and delivery of infrastructure and social services for the poor through the use of performance- based incentives, rewards, or subsidies. OBA links the payment of aid to the delivery of specific services or "outputs," such as connection of poor households to electricity grids or water supply systems, installation of solar heating systems, or prenatal care and safe delivery services for new mothers. The subsidy is explicitly targeted to benefit the poor, which can be achieved through several means, depending on the context of the project and environment. Under an OBA scheme,

Case-I: OBA in Nepal's Biogas Support Program

The biogas support program of Nepal successfully combines carbon finance with output-based subsidies to provide affordable household-size biogas plants to rural families in Nepal. The subsidies vary according to the plant's size and location. Smaller plants, used by poorer families, receive relatively higher subsidies than larger plants. Biogas plants in remote mountainous regions, where the population is poorer, receive a higher subsidy than biogas plants in the Terai lowlands, where population is better off.

service delivery is contracted out to a third party—public or private—which receives a subsidy to complement or replace the required user contribution. The service provider is responsible for pre-financing the project, and is reimbursed only after the services or outputs have been delivered and fully verified by an independent verification agent (IVA).

II. Conditional cash transfers (CCTs), are an instrument that has been used primarily to transfer cash to poor households on the condition that they "make pre-specified investments in the human capital of their children" (Fiszbein and Schady 2009), but which could potentially be used outside the social development sector to encourage certain social behaviours, such as adoption and use of an improved cook stove. Integrating this RBF instrument into the renewable energy sector will be useful for decentralized micro-scale renewable energy projects (like solar PV, biogas, pico-hydro power projects, stoves etc.)

III. Inducement prizes, which are usually 'ex-ante', one-off incentives that are awarded against pre-determined criteria in order to spur innovation towards a pre-defined technological, commercial or social goal (DEW Point 2011);

IV. Output-based aid, which is an attempt to improve the efficiency of capital subsidy schemes by providing one-off capital incentives for the verified commissioning or provision of physical assets such as electricity meters or solar home systems (GPOBA 2010);

V. Performance-orientated transfers (also called 'output-based grants'), which are used by governments to drive the delivery of results by state or local governments, or by public utilities through transfers that "place conditions on the results to be achieved

while providing full flexibility in the design of programs and associated spending levels to achieve those objectives" (Shah 2006);

VI. Vouchers, which are an alternative way of providing capital or revenue incentives for a particular product or service by directly stimulating consumer demand

n. NAMAs

Mitigating climate change is a collective endeavor that requires immediate action supported by strong national leadership and active international cooperation. In this context, the concept of "nationally appropriate mitigation actions" or "NAMAs" refers to national policies and actions that reduce greenhouse gas (GHG) emissions against business-as-usual (BAU) scenarios. NAMAs are communicated in the form of voluntary pledges to international climate negotiations through submissions under the UN Framework Convention on Climate Change (UNFCCC). NAMAs constitute an important part of national low-carbon development strategies; they offer an opportunity for developing countries to engage in climate change mitigation beyond the project offsetting structure of the Clean Development Mechanism (CDM). The concept of NAMAs recognizes that developing countries should enhance their mitigation actions, depending on the availability of assistance from developed countries, but without interfering with a country's sovereign right to determine its own low-carbon development strategy and policy choices, which depend on national context and respective capabilities .

Regardless of their form and format, NAMAs are expected to follow a performance-based logic and be linked to real and measureable emission reductions. Where NAMAs are implemented with international support, they are subject to both national and international measurement, reporting and verification (MRV). From a business point

of view, the link of NAMAs to predictable, stable and longer-term policies can offer substantial investment opportunities. At the same time, standards formulated in the context of NAMAs may change the political framework for business, for example through the introduction of feed-in tariffs for renewable energy generation, building efficiency codes, renewable energy policies, low-carbon transport and energy infrastructure, performance standards for industries or other relevant measures.

Quick facts of NAMAs:

- Conceived in Bali in 2007 (COP13), confirmed and elaborated in Cancun 2010 (COP16)
- Voluntary mitigation actions by developing countries
- Any government-sponsored and prioritized policy, program, project that results in measurable GHG reductions can be a NAMA
- Enabled in part by domestic investments and in part by international financial support
- Performance based - stringency of MRV depends on the source of finance
- A NAMA Registry will record information and facilitate the matching of action and support

Financial mechanisms of NAMA must be tailored to the unique circumstances in each country to overcome specific market/financial barriers. As of now, there are only bilateral funds for supported NAMAs from German Government, UK-AID, Japanese, France and Austrian government. Private sector involvement in the NAMA implementation is yet to happen. In the coming years, Green Climate Fund is expected to provide financing for NAMA implementation.

Application to RE Sector:

NAMAs are important from the perspective of (new) potential investment opportunities. It is expected that majority of donor's funds will be focused on low emission development activities. The future investment in sectors of renewable energy, clean technologies, agriculture, forestry, biodiversity and even the service sectors like tourism and hospitability are increasingly becoming focused on low emissions and hence future funding sources such as green climate fund will focus there. For instance, eight of the world's largest multilateral development banks pledged to invest USD 175 billion for

the creation of sustainable transportation projects particularly in Asia and Africa over the next 10 years by focusing on the use of biofuel and renewable energy sources. The African Development Bank, Asian Development Bank, CAF-Development Bank of Latin America, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank, Islamic Development Bank and the World Bank, made the announcement at the United Nations Conference on Sustainable Development at the Rio+20 Summit on June 20 . Similarly, the recent initiatives like Energy+ and Sustainable Energy for All, intend to support the development and implementation of low-carbon energy sector policies and incentive schemes in developing countries to catalyze private investments at scale.

The core concept foresees payments for sector level performance for energy access and emission reductions versus a business-as-usual baseline. The initiatives also aim to support capacity building for monitoring,

Case-II: NAMA in Biogas Sector:

SNV has a clear choice of adopting its successful biogas programmes into country specific NAMAs. In fact, this will be more appropriate for developing countries and economy in transitions viz., Vietnam and Indonesia, as because these countries will be only eligible for new market mechanism of UNFCCC. Whereas, the least developed countries (LDCs) can continue with current approach of carbon finance (CDM and Gold standard VER).

To start with, the Programmme of Activity (PoA) of biogas of Indonesia and Vietnam could be taken up. The current PoAs eligibility criteria of CDM limits the scaling-up potential within the PoA (e.g., maximum target of biogas digester for each CPA can't exceed the threshold limit of the approved CDM methodologies), but could be expanded within a NAMA framework which could include the overall bio-digester market, additional activities that reduce the utilization of NRB, fossil-fuels and fertilizer, thus promoting low carbon rural development. Existing monitoring and verification procedures can be used and scaled-up to cover a broader range of NAMA level activities. Eventually, the NAMA MRV would capture emission reduction benefits that cannot be accounted for within the CDM, thus showing a much larger quantity of emission reductions.

reporting and verification (MRV) under a NAMA like mechanism. Furthermore it seeks to establish new carbon market instruments following a sectoral approach compatible with UNFCCC standards and aims to accelerate the planning and implementation of NAMAs in developing countries.

0. Corporate Social Responsibility (CSR) Fund

In a recently published discussed paper on Corporate Social Responsibility, UNDP (2014) stated that CSR can be linked into the climate change mitigation and NAMAs. The paper argues for governments to seek out businesses and organizations, and identify opportunities for aligning their CSR practices with the UN's Millennium Development Goals (MDGs) and undertaking a more holistic approach, there needs to be social, economic and environmental improvement. (For example, undertaking energy efficiency in industry benefits economically while contributing to improved air and water quality) Initiatives such as NAMAs provide developing countries an opportunity to establish a sector specific national action plan and offer a number of building blocks including for example a climate fund / financing, window for technology transfer, capacity building, and support for measuring, reporting and verification – that eventually lead to low carbon sustainable development.

The CSR Fund can be established utilizing several different types of grant mechanisms and/or financial instruments. The fundamentals of these types of structures are not new to the public and private sector. UNDP identified two types of financing mechanism for CSR fund. It will be useful to examine the applicability of this funding instrument in real case scenario. A brief discussion on the CSR fund is presented below.

I. Grant Co-financing Facilities (GCFs) and Revolving Loan Funds (RLFs) are the two types

of mechanisms and instruments deemed most appropriate for the unique nature of establishment and operation of CSR Funds. GCFs and RLFs allow a CSR Fund to target additional grants and loans to specific areas of interest, and the flexibility to change the areas of interest over time. Typical GCFs give grants for co-financing of projects of between 30% to 80 %, and are commonly structured based on an open call / tender for proposals. Some proactive GCFs actually source or create projects to invest in, or join other GCFs and loan programs in multilateral activities.

II. RLFs are commonly structured to either provide no- or low- interest loans to projects, or to operate as a loan credit facility. The difference is in how the reserve funds are utilized, either distributed directly as principal to the loans, or deposited in commercial banks which allow selected loans to use the reserve funds as collateral / credit. It is common for GCFs and RLFs to specifically target areas of interest which have trouble gaining private sector finance or represent high risk or no-return investments.

Application to RE sector:

CSR Fund can be promoted in the renewable energy sector and of late, a few global conglomerates like Total, British Petroleum, Shell Group, Microsoft etc. are investing in development of renewable energy projects. These companies are passionate about clean energy and reducing emissions for a sustainable future. This ethos is at the heart of everything most of these companies do across the entire organisations value chain whilst ensuring that the companies and shareholders earn a return from our activities and thus invest in our growth. Besides, carbon credit buyers are in this CSR fund category, which purchases tonnes of carbon credit emissions reduced compared to baseline business as usual across renewable energy projects.

P. Linking to Taxes on globalized activities

One of the first innovative financing for development initiatives to be implemented was the 'international solidarity levy on air tickets' (or airline ticket tax). It was launched in 2006 by the Governments of Brazil, Chile, France, Norway and the United Kingdom, and was endorsed by the Secretary General of the United Nations. Philippe Douste-Blazy, the UN's Special Advisor on Innovative Financing for Development has described the initiative as "a great sign of global solidarity" (UNITAID, 2011).

The tax on airline tickets is levied by the governments of participating countries. It is paid by individual air passengers when they purchase their ticket and airlines are responsible for collecting and declaring the levy. The cost of the tax varies from one country to the next but is low compared to the overall cost of the ticket. For instance, Chile imposes a fixed rate of USD 2 on all international flights. France distinguishes between economy and business/first class air travel. €1 is levied on domestic and European flights and €4 on international flights in economy class. Business and first class travellers are charged €10 for domestic and European flights and €40 for international flights (UNITAID, 2011).

Figure.5: *Air-Ticket Tax Mechanism*

Most of the resources raised through the airline ticket tax are channelled into UNITAID. The agency was founded specifically to channel resources raised through this initiative into treatment and care for those affected by HIV/AIDS, tuberculosis and malaria. UNITAID derives around 70% of its income from the international solidarity levy on air tickets. The remainder comes from more traditional multi-year budgetary contributions from bilateral partners and other donors (UNITAID 2011).

Application to RE Sector:

This financing instrument has been applied to the carbon footprint sector, which can be linked into the clean energy development and forestry projects. Use of this instrument for financing the deployment of renewable energy technologies is also a potential area.

Q. Climate Bonds

Climate bonds are one potential mechanism or vehicle that is expected to fund the private sector

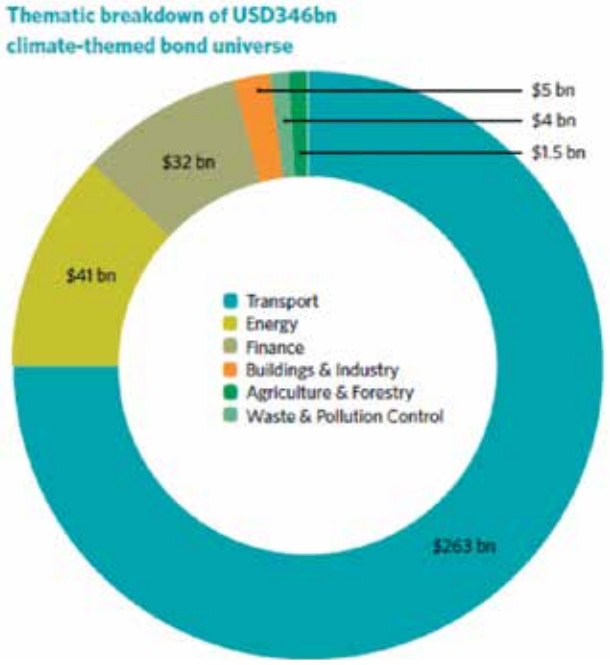


Figure.6: *World Share on Climate Bonds*

9. http://www.climatebonds.net/resources/overview/climate-bonds-for-beginners

gap—one that may make a substantial contribution relative to commercial banks and alternative assets. A bond is a type of loan which companies, governments, and banks use to finance projects. The issuer of the bond (the borrower) owes the holder (the creditor) a debt and, depending to the terms they agree on, is obliged to pay back the amount lent within a certain amount of time and with a certain interest. Climate bond is used to finance – or re-finance - projects needed to address climate. They range from wind farms and solar and hydropower plants, to rail transport and building sea walls in cities threatened by rising sea levels. Only a small portion of these bonds have actually been labelled as green or climate bonds by their issuers[9].

The climate/green bond market includes all of those bonds which have been issued to help finance climate-friendly projects. At present, the climate bonds market has an estimated value of USD 346 bn (Figure.6), a significant expansion on the 2012 estimate of USD 174 bn. It remains dominated by Transport (USD 263 bn),

Energy (USD 41 bn) and Finance (USD 32 bn). There are around USD 14.5 billion outstanding of

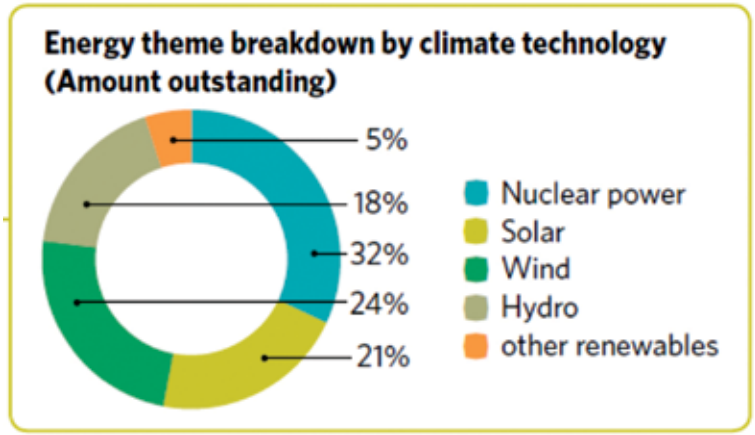


Figure.7: *Climate Bonds in Energy*

labelled climate bonds and green bonds[10]. Following the recent financial crisis, the bond market is attracting growing interest as a source of debt capital to finance the 'green infrastructure' the climate economy needs.

Application to RE Sector:

According to the report on Bonds and Climate Change: the state of the market in 2013, USD11.6bn climate bonds are in issuance in 2012 and in early 2013 the issuance arrived to USD41bn with bonds linked to nuclear power (32%), solar (21%), wind (24%), hydro (18%) and other renewables (4%). (Figure.7). Approximately, USD5.5bn of wind and solar project bonds with three landmark Canadian project bonds had also be issued during this period. Hence, there is a promising prospect of renewable energy sector in the climate bonds market and renewable energy developers are expecting to be benefited from this innovative financial mechanism.

1.5. Conclusion

This list is by no means exhaustive, but the underlying principle of results-based disbursement applies to all the modalities of innovative finance described above. There is significant potential to broaden the application of innovative financing in the energy sector, in particular by experimenting with market-focused instruments that aim to catalyse private sector delivery and self-sustaining business models, as opposed to capital support for public service delivery (i.e. OBA).

Further work is required to determine which situations, from an economic perspective, might benefit most from the use of innovative financing, but it has the potential to encourage a move away from a traditional focus on inputs and spending, towards a

10. http://www.climatebonds.net/files/uploads/2013/08/Bonds_Climate_Change_2013_A4.pdf

results culture that better articulates the value-for-money of one intervention over another.

Innovative financing has not been widely applied in the energy sector. However, of late, international energy initiatives like Sustainable Energy for All [SE4ALL], Energy+ etc. have highlighted the importance of innovative financing for achieving Sustainable Energy for All's objectives. The SE4ALL estimated that approximately USD 500 to USD 1200 billion of additional capital per year will be required to meet the objectives of the SE4ALL and hence resourceful solutions that promote the use of innovative finance to mobilize and leverage public and private capital are needed in order to positively transform the world's energy systems .

In line with this vision of SE4ALL, priorities for results-based aid are likely to be set by high level policy priorities, such as those outlined by the UN Sustainable Energy for All initiative on energy access, renewable energy, and energy efficiency, but precise objectives are likely to be highly country-specific, and will be partially influenced by donor interests and the easy of monitoring and verification. Innovative financing could be used for a very wide range of objectives down to incentivizing the deployment of a single technology, and instrument choice will therefore be highly contextual. In the subsequent chapters, a case study on innovative finance in Nepal has been examined, which presents a range of financial instruments. Indeed, these tools can also be used in other countries.

CHAPTER 2

FEASIBILITY OF INNOVATIVE FINANCE IN NEPAL: A CASE STUDY

2.1. Introduction

Nepal is increasingly facing unprecedented energy crisis or energy poverty despite its rich natural resources. This is reflected in the fact that around 44% of the population of the country still do not have access to electricity and are forced to rely on polluting and unsustainable source such as kerosene lamps. Similarly, above 80% of the total energy consumption for cooking comes from traditional sources[12] such as firewood, agriculture residue, charcoal etc. Various studies have shown that use of such traditional sources not only leads to respiratory diseases and other health problems, unnecessary drudgery to women but are also a major cause of deforestation and climate change. This clearly indicates a need for a wider use of a greener and sustainable energy source or renewable energy.

On the other hand, in spite of having enormous potential for renewable energy, the country so far has been able to utilize hardly 1 % of the renewable resources[13]. Nevertheless, more than 1.5 million households in Nepal have benefitted from renewable energy sources for cooking, lighting and other end uses[14], due to continuous financial and technical support of the Government of Nepal (GoN) through the Alternative Energy Promotion Center (AEPC) and its development partners.

For the promotion of renewable energy technologies (RETs), AEPC provides subsidy (except for mud-Improved Cookstove) covering 40% of the total cost and encourages end-users to manage the remaining cost by taking a loan (40%) from financial institutions and through own contribution (20%)[15] of users. This implies that end-users

12. AEPC annual report, 2010/2011

13.AEPC annual report, 2010/2011

14. AEPC/MoSTE (2013). Subsidy Policy for Renewable Energy, 2069

15 AEPC subsidy policy, 2013

manage 60% from their internal resources. Studies on financing scenario in RE sector in Nepal highlights that regardless of subsidy support, the end-users in rural areas with low income face barriers mainly due to i) high upfront cost of these RET except for mud-ICS compared to traditional energy sources ii) limited options and access to financial services for RET iii) low level of awareness about RET market possibility among micro-finance institute iv) limited budget with micro-finance v) low level of awareness among end-users about availability of financing options and vi) fewer commercial banks engaged in deprived sector lending especially related to RET due to various reasons.

Moreover, the current issue in RE sector is not only the absence of financing mechanisms but also high dependency of users on subsidy and donor aid. Therefore, there is increasing trend among RE related programs and stakeholders to shift their approach from subsidy to market orientation. This implies that subsidy mechanisms should be gradually reduced and should be aligned towards robust market driven scenario so that RE sector can progress and sustain even in the absence of subsidy or donor support. The push towards market-driven approach looks promising in providing opportunity to create self-sustaining models where a competitive business environment can be created and financial institutions can be strengthened. Studies also show that financing institutions in Nepal are becoming aware of the need and market in RE or climate smart green projects and are gradually interested to invest. For example, an energy finance market study carried out by IFC[16] suggests that commercial banks/private sector in Nepal are willing to finance renewable energy sector/green projects/energy efficiency and are adapting themselves for sustainable energy financing needs.

Therefore, the renewable energy sector in Nepal has an increasing appetite towards new ways and means of financing. And, the REDD+ in Energy and Agriculture Program

16. Sustainable Energy Finance Market Study for Financial Sector in Nepal. (2012). International Finance Corporation (IFC).

(REAP) of SNV Netherlands Development Organisation has investigated this changing scenario of Nepal's financial sector in light of the potentiality of introducing innovative financing in Nepal. The objective of this review was to develop a detailed understanding on plausible innovative financing instrument in the renewable energy sector in Nepal and identifying various innovative finance instruments that can be used globally in other SNV countries.

To investigate the changing scenario of Nepal's financial market, this present study assessed the current financing models and practices and explored innovative approaches to take the practices forward. In doing so, this study mainly aimed at:

- Identifying globally used key innovative financing instruments including results based financing (RBF) for promotion of RETs in Nepal
- Assessing the renewable energy finance sector in Nepal
- Exploring best appropriate innovative financing mechanisms/instruments applicable
- Assessing the readiness and practicality of such mechanisms with reference to local institutional set up, private sector engagement and interest, development partners priorities and users preferences and needs
- Assessing feasibility of the conceptual frameworks and models for innovative financing already developed by SNV and also to test in form of pilots in different context of financing scenarios.

The study findings and assessments are carried out in the context of 3 selected RETs- ICS, solar PicoPV and community electrification.

2.2. Overall approach of the Case Study

Both a qualitative and quantitative research approach was used for primary data collection. For qualitative data collection, the study team carried out consultations with stakeholders, which primarily included government agencies, NGOs, development organizations-bilateral and multilateral agencies, and financial institutions. The purpose of the meetings was to seek stakeholders' perspectives in different financing modalities and its feasibility in the context of Nepal. A checklist was used for this purpose. Similarly, for quantitative data collection, a total of 72 households (HHs) were surveyed, and 3 micro-hydro users committees and 3 cooperatives were interviewed in three selected districts (Dadeldhura, Dailekh and Nuwakot) of Nepal. Tools such as questionnaires and Key Informant Interview checklists were used for this purpose. Following data analysis, the research team arrived at a set of appropriate financing modalities leading to development of innovative and decentralized financing for renewable energy solutions.

2.3. Financial sector in Nepal

Nepal's economic and banking sector is regulated by the Nepal Rastra Bank (NRB), the central bank of Nepal. Established in 1956 under the Nepal Rastra Bank Act 1955, NRB is the monetary, regulatory and supervisory authority of banks and financial institutions. Its functions, inter alia, include those of banker to the GoN, preparing monetary policy, Bank and FI regulation, foreign exchange management, and bank/FI/MFI supervision. Energy lending is a priority area for the NRB. Over the past three decades, there has been rapid growth in Nepal's financing sector mainly due to reforms and liberalization in the sector[17]. The financing sector currently are of four types as licensed by NRB[18]. The types, class type and their total numbers in Nepal (as of January 2013) are shown in the table below.

17.Clean Start detailed business plan Nepal
18. NRB (2013). Financial Stability Report

Table 2: Types and number of financial sector in Nepal

Types of banking sector	Class type	Number (as of January 2013)
Commercial Banks	Class 'A' type financial institutions with full banking license with foreign exchange transactions	32
Development Banks	Class 'B' type with partial banking license excluding foreign exchange transactions	90
Finance Companies	Class 'C' type with limited banking license	67
Microfinance institutions (MFIs)	Class 'D'	25

In addition, there are 16 NRB permitted cooperatives and 34 permitted NGOs, both with limited banking activities[19]. The non-banking sector in Nepal's financial system comprises cooperatives, and saving funds and trusts like Employee Provident Fund, Citizen Investment Trusts, postal saving offices, and insurance companies, not licensed by NRB.

In the renewable energy sector, all the four categories of financial institutions are active. The involvement of financial institutions in the RE sector is mainly for credits, micro-finance and in case of big hydro-power project, commercial banks take part with its commercial lending facilities. A detailed assessment of the current financing mechanism in RE sector (particularly, decentralized RETs) is provided below.

12. *NRB (2013). Financial Stability Report*

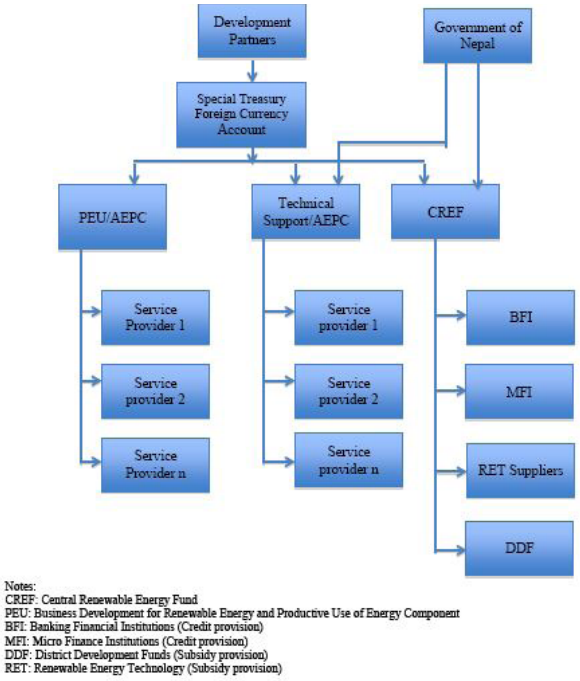


Figure.8: *NRREP flow of funds (Source: GoN, 2012)*

2.4. Assessment of current financing modalities for RETs

2.4.1. Subsidy

Dissemination of all RETs in Nepal has been driven by a subsidy provided by the government through Alternative Energy Promotion Centre (AEPC), which is the apex body of the government to promote RETs in Nepal. The subsidy is delivered through a Cash Fund, which previously was the Rural Energy Fund but now is being replaced by the Central Renewable Energy Fund (CREF)[20]. The CREF is being established as the core financial institution or Financial Intermediation Mechanism responsible for the effective delivery of subsidies and credit support to the renewable energy sector. It mainly issues subsidies to the District Development Fund (DDF) and qualified companies, manufacturers or sellers who install the RETs and provide

20. The Central Renewable Energy Fund (CREF) was preceded by Rural Energy Fund (REF)

adequate after-sale services at the local level. Besides, by providing credit to banking financial institutions (BFIs) and Micro-finance Institutions (MFIs), it also facilitates the provision of credit facilities to households and communities that wish to acquire RETs. The Fund established under the National Rural and Renewable Energy Programme (NRREP) is supported by different donor agencies and administered by AEPC. NRREP is a single programme modality introduced in 2012 in order to streamline aid to the rural and renewable energy sector in Nepal.

The 'Subsidy Policy for Renewable Energy 2069 BS' defines the level of subsidies available for all types of RETs applicable to Nepal. In the selected RETs under this study, GoN provides subsidy for metallic ICS, home PV systems with 10 Wp and above 20 Wp and community electrification systems for pico hydro (less than 10 kW) and micro hydro (10 kW to 100 kW). There is no subsidy for mud ICS due to its low capital cost. Therefore, AEPC supports training and capacity building of households in remote districts. However, even in the case of metallic ICS, the subsidy is not adequate and the poor recipients find it difficult to raise even the meager amounts of their contribution. Therefore, agencies like UNDP concentrate on programs[21] that aim at raising income of the people.

The subsidy rate is designed on the basis that around 40% of the total cost is covered by the subsidy, around 40% by the soft loan from the financial institutions, and the rest a minimum of 20% by the community or households as in kind and cash contributions[22].

In order to reduce the dependency on subsidy for RETs, the Subsidy Policy promotes linkage of subsidy with credit, and gradual decrease of subsidy in order to replace it with the credit in the long-term[23]. This will help to ensure that commercialization of RETs becomes market-driven i.e. through demand for energy. While this will lead towards financial sustainability in RETs, the risk of market failure is also reduced in case there is lack of fund for subsidy.

21. For example, the "Renewable Energy for Rural Livelihoods program".

22. AEPC/MoSTE (2013). Subsidy Policy for Renewable Energy, 2069

23. AEPC/MoSTE (2013). Renewable Energy Subsidy Policy, 2013

Pros

- Transparent and clear mechanism
- Helps to lower financial burden
- Effective way to encourage poor to adopt renewable energy

Cons

- Leads to market distortion
- Unsustainable way of financing

2.4.2. Direct lending to end users

Some commercial banks extend credit directly to the end users for community electrification projects. For example, the Agriculture Development Bank Limited (ADBL) provides loans directly to end-users for micro-hydro projects. Similarly, Nabil Bank, Kist Bank, Kumari Bank and Himalayan Bank have supported 7 micro-hydro power projects (MHPs) with a loan amount of NPR 26.4 million.

Pros

- More efficient as the transaction costs on intermediaries is avoided.

Cons

- The concept of lending directly to individuals who are end-users of micro energy systems is relatively new and untried.
- Credit delivery and recovery to/from customers in remote areas is a major challenge for commercial banks.

- This system is suitable for MHPs but may not be applicable for other smaller RETs with cost low and thus have high transaction cost.

2.4.3. Direct lending through debt fund or earmarked fund

In some cases, credit financing is made available for certain RETs through an earmarked Debt Fund. For example Micro Hydro Power Debt Fund (MHDF) is one such fund for financing micro-hydro projects which has been supported by Energising Development (Endev). EnDeV advises two selected banks (Himalayan Bank and Clean Energy Development Bank (CEDB)) who partner to utilize this 0.5 million Euros Fund on how to administer funds for financing MHP projects. RERL also aims to support AEPC to operationalise the FUND.

Pros

- More efficient as the transaction costs on intermediaries is avoided.

Cons

- Lender should have full technical knowledge of RETs, including their limitations.
- Access to finance for only RETs for which the fund has been earmarked.

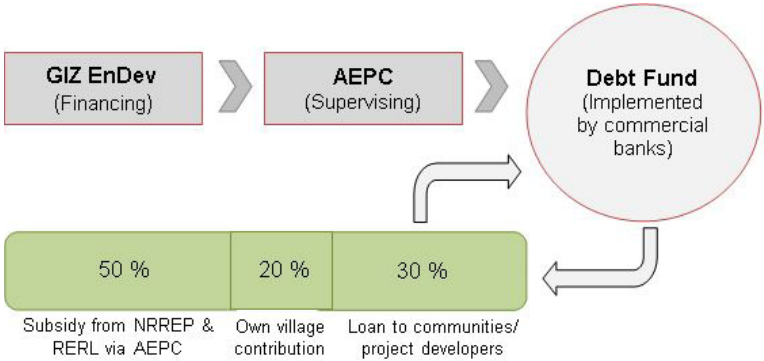


Figure.9: *Schematic diagram for fund flow of Micro Hydro Debt Fund (Source: Energypedia.info)*

2.4.4. Wholesale financing to MFIs - Deprived Sector Credit Programme

Commercial banks provide wholesale loans to microfinance institutions, for energy lending through the mandatory Deprived Sector Credit Programme. NRB's policy also promotes productive sector lending by requiring commercial banks to provide minimum 10% loan to agriculture and energy sector projects.

Pros

- Reduces administration costs for the banks
- Repayment rate can be arranged as per each household's need
- Collaterals can be in varied form-personal guarantee, cattle, land ownership, etc.

Cons

- Lack of expertise in energy lending and RETs by the microfinance retailers who only have basic capacity in delivering and managing credit.
- MFIs may not be operational or may be unwilling to lend for purchases of RET hardware as loan terms

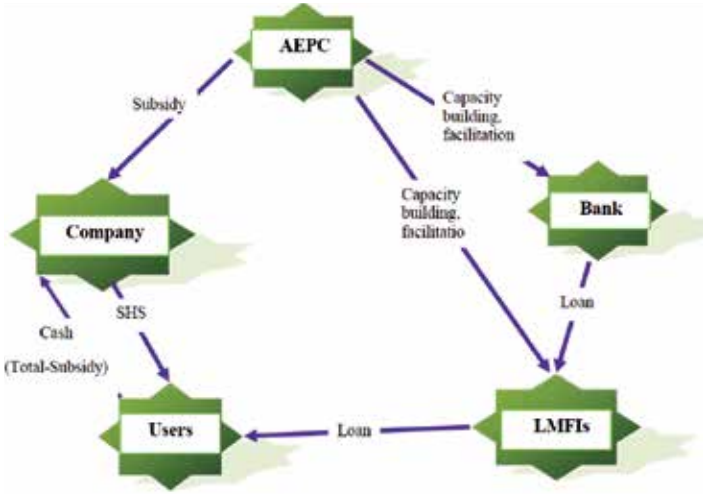


Figure: 10

are longer than typical MFI loans and dependent on household incomes rather than revenue generation for repayment

Energy Sector Assistance Programme (ESAP), which phased out in 2012, applied this model for solar home systems (SHS). It partnered with commercial banks who then on-lend to local financial institutions or MFIs for credit financing. Users had to be member of the MFIs to access the loan. The programme also provided private companies with subsidy and collaborated with them to supply the SHS and provide after-sale services.

2.4.5. Wholesale financing to MFIs/LFIs - technology fund

In this mechanism a credit fund is dedicated to a specific RET to provide wholesale financing to MFIs. For example, Biogas Credit Fund (BCF) is a revolving fund (USD 35 m) established under the Biogas Support Programme (BSP). It provides wholesale loans to MFIs at an interest rate of 6% per annum which MFIs then lends to clients at a maximum of 14% per annum. Participating MFIs are required to finance at least 10% of the loan amount with matching funds[24]. BCF business model is considered to be successful one considering good credit recovery. Scaling Up Renewable Energy Programme in Low Income Countries (SREP) of the AEPC plans to replicate the same business model.

2.4.6. Financing through micro-finance institutions

Micro-finance is termed as the financial services rendered to the deprived groups of the people and small entrepreneurs in savings, credit, remittance, micro insurance, etc. to help them in developing self-employment opportunities and various income generating activities. Although many programmes have been implemented for poverty lessening initiatives in Nepal, only micro-finance programmes are seen as pro-poor and rural based. Micro-finance has been particularly recognized as an effective development intervention by NRB[25].

24.Clean Start Nepal, Detailed Business Plan

25. Some glimpses of micro-finance activities in Nepal, Micro-finance Promotion & Supervision Department NRB June 2013

There are four types of microfinance institutions recognized in Nepal- a) Microfinance Development Banks, b) Regional Development Banks; c) Savings and Credit Cooperatives and d) Financial Intermediary NGOs (FINGOs) licensed by the NRB.

In terms of client base among MFIs, the Micro-finance Development Banks (MFDB) are the largest in the country, with one MFDB serving 25,000 to 150,000 clients. This is followed by FINGOs and Saving and Credit Cooperatives, which serve 2,000-30,000 and 50-1,000 clients respectively[26]. Similarly, the biggest provider of financial loans by formal sector are FINGOs and cooperatives, serving 41% of the households, dominating the rural (45%), hills and mountain areas (60%). This is followed by banks, serving 35 % of the households and dominating the urban areas (54%) and wealthiest households (47%). They are the largest providers of loans more than Rs. 50,000.

The micro-finance sector follows several modalities, of which the following are recognized as successful by NRB and relevant to the alternative energy sector:

i. Deprived Sector lending model

The NRB's policy under the deprived sector lending programme requires that of total loans issued by commercial banks, development banks and finance companies, at least 4.5%, 4% and 3.5% respectively must go to deprived sectors. The 'deprived sector' includes small and medium enterprises (SMEs) and RETs[27]. Similarly, NRB's policy also promotes productive sector lending by requiring commercial banks to provide minimum 10% loan to agriculture and energy[28].

ii. Rural Self-Reliance Fund model

As an initiative to reach the poor and deprived rural people, a Rural Self Reliance Fund

26. CleanStart Detailed Business Plan-Nepal

27. SREP Investment Plan

28. Nepal Rastra Bank (2013). Financial Stability Report. January 2013/ Issue 2.

(RSRF) was created through Nepal Rastra Bank. The Fund channeled through cooperatives, NGOs and micro-finance is provided as credit to carry out income generating activities and render employment opportunities. Renewable energy is also one of the sectors that RSRF promotes. RSRF model has worked well as it is easy to obtain the loan with less administrative hurdles and also because of the prompt monitoring mechanism. However, RSRF's activities have been limited more in Eastern and Central Development Region[29].

The rate of interest charged by RSRF is 8%. The Fund, however, returns 6% of the collected interest to the respective MFIs for meeting their operating expenses if they pay their loans on time. Hence the effective rate is only 2% per annum, which distorts the market rate[30].

iii. Saving and credit cooperative model

The Saving and Credit Cooperatives (SACCO) serve community members in a given locality and provide their members services through deposits, savings as well as loans. Loans, with typical interest rate of 18-24% are provided for a minimum of three months to three years for various purposes.

With low operation cost of the institution, less administrative or bureaucratic process and competitive interest rates for loan borrowers, SACCOs serve well in rural areas, especially in hills and mountains, in providing financing services. However, these self-regulated SACCOs are sometimes mismanaged and the members generally do not have adequate education on cooperative principle. As they are not centrally regulated, they tend to lack standard accounting and sound management practices[31].

29.NRB & CECI (2008). Micro-financing towards Empowerment of Disadvantaged Groups in Nepal: Innovations and Practices
30. Shrestha, S. (2009). State of Microfinance in Nepal.
31. Shrestha, S. (2009). State of Microfinance in Nepal.

iv. Small farmers' cooperative model

The Agriculture Development Bank Ltd. (ADBL) initiated Small Farmers Co-operative Limited (SFCL) as autonomous institutions, owned and managed by the farmers. It is a product of the first poverty focused credit program in the country- Small Farmers Development Project (1976) of ADBL itself. ADBL then established Small Farmers Development Bank (SFDB) in 2002 to provide wholesale lending to SFCLs for on-lending to small farmers.

The SFCL model has three tier structures-village level, ward level and VDC level. At the village level, farmer, groups organize regular meetings to collect mandatory savings and loan repayments and applications for loan demand. At the ward level, farmers' groups with common interest and proximity form inter-group association. The loan applications are forwarded to the respective inter-groups, which appraise them and forward with recommendations to the Executive Committee (VDC level) for final decision.[32] SFCLs which get wholesale lending from SFDB at 9.5% per annum disburse loan to their clients at the interest rate ranging between 12 to 16% per annum with repayment time of 2 to 5 years.[33]

v. Project-based micro-credit model

Some donor supported projects also provide micro-credits for specific purposes, which could be geographic, sector, or gender focused. Among such micro-credit programmes operated in the past were Production Credit for Rural Women (PCRW), Micro-credit Program for Women (MCPW), Poverty Alleviation Project in Western Tarai (PAPWT), Third Livestock Development Project (TLDP), Rural Microfinance Program (RMP) and Community Ground Water Irrigation Service Project (CGISP) and Enhancing Access to Financial Services (EAFS) Project.

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32. Shrestha, S. (2009). State of Microfinance in Nepal.

33. NRB & CECI (2008). Micro-financing towards

vi. Grameen banking model

In the Grameen banking model, peer groups are formed each comprising five members. Three to ten such groups meet once regularly in which group members collect mandatory and voluntary savings, make loan demands as well as repay loans. For the loans, group guarantee for repayment is considered sufficient rather than collateral.

The target peer groups are identified by MFIs. The MFI field staff facilitates the regular meetings and collects savings, loan repayment installments and loan demands. In addition, he/she also verifies the utilization of disbursed loans.

This model works well in areas with more developed the market and road infrastructure and vibrant economic activities. Hence, the model favors Terai than the Hills and Mountains.[34]

vii. Wholesale lending model

Wholesale micro-financing in Nepal was introduced in 90's with the establishment of Rural Self-Reliance Fund (RSRF) managed by the NRB. Thereafter Rural Micro-credit Development Center (RMDC) started in 2000 to provide wholesale credit to retail MFIs such as rural development banks, micro-finance development banks, saving and credit cooperatives and financial intermediary NGOs (FINGOs). RMDC provides this service to MFIs at 5-6 % for on-lending purposes as well as for institutional strengthening and capacity building. Similarly, in 2002, Sana Kisan Bikas Bank was established to provide wholesale credit to Small Farmers Co-operative Limited (SFCL). Other wholesale lenders are National Co-operative Development Bank (NCDB) and First Microfinance Development bank Ltd. (FMDBL).

34. Shrestha, S. (2009). State of Microfinance in Nepal.

While wholesale lenders charge around 5-8% to retail MFIs, the MFIs however do not have any cap on the interest rate on loans to their clients. Commercial and Development Banks also provide wholesale fund to MFIs under the Deprived Sector Lending Programme.

While Financial NGOs and Savings and Credit Cooperatives models are successful, they being limited to the members of the institutions, NRB has discontinued issuing licenses to these types of MFIs. Due to the growing MFI sector, NRB finds it difficult to regulate the sector. Therefore, an Act regarding Micro Finance Authority has been drafted and proposed with the provision of establishing a Second-Tier Institution aiming at regulating and supervising the scattered micro finance institutions throughout the country. The proposed MFI authority is expected to carry out all the functions of a regulator of MFI, including granting licenses, setting rules of the fund raising and loan terms, jurisdictions and supervision. This would help improve the functioning of MFIs in Nepal and people's faith in the MFI system.

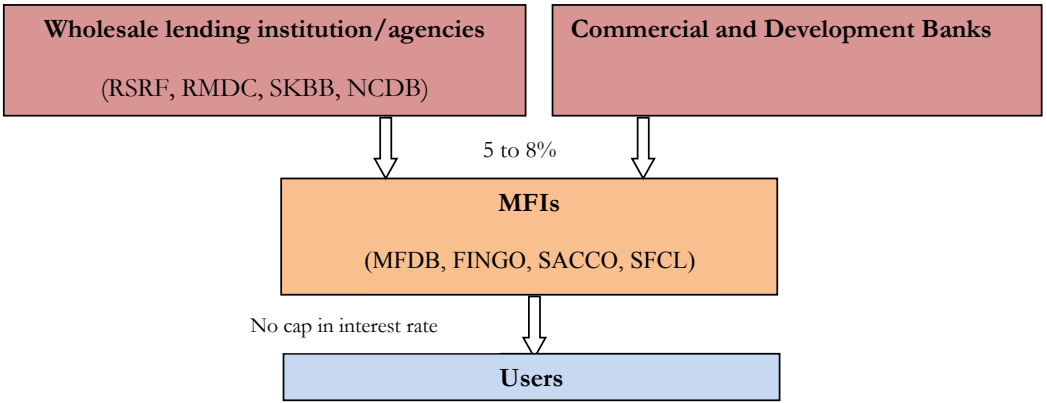


Figure.11: *Wholesale lending model*

Pros of financing through MFI

- Access of finance for low-income households and rural people.
- Can help in uplifting socio-economic status of poor people
- Rural population can easily access financial services through simple procedures.
- Provides immediate credit

Cons of financing through MFI

- MFIs have high liquidity and low profitability
- High interest rate as compared to commercial banks
- Do not have adequate funds for financing RETs such as micro-hydro
- MFIs such as SACCO are not considered credit worthy for investments by commercial banks

2.4.7. Financing through informal sector

Borrowing from the informal sector, i.e. through friends and families is prevalent throughout Nepal especially among the poorest households. It is more pronounced in rural area, in the hills and mountains, and in the Western region with 40%, 46% and 52% of the households accessing loans from the sector.[35] One major reason for this is the unavailability of other formal sectors, especially local MFIs in these areas. Loan from informal sector is usually charged at 3 to 5% per month with about 42% of the sources charging interest on it.[36]

35. Ferrari, A., Jaffrin, G., Shrestha, S.R. Access to Financial Services in Nepal. World Bank.
36. Shrestha, S. (2009). State of Microfinance in Nepal.

Pros

- Reliable and easy source of financing.
- Low interest rate
- No requirement of collateral in most of the cases
- No formal procedures to be followed

Cons

- No safeguards to recover repayment

2.5. Current Innovative finance in RE

Innovative financing is still an emerging concept for financing in RE sector in Nepal whereas this has been practiced well and lessons drawn in other parts of the world. Nonetheless, the experience in Nepal so far is still encouraging as most of the ongoing programmes in RE have given importance to the need of innovative and results based finance mechanisms. These programmes have viewed innovative finance as one of the ways to create sustainable finance in RE sector. Some of these programmes have implemented such mechanisms such as vendor financing, carbon financing, output based aid etc. and they seem to be keen on exploring additional innovative finance mechanisms within their project period.

The table 3 below provides a tabulated summary of some donor-funded existing RE programmes or projects and their current or potential financing mechanismst which also include innovative financing instruments.

33. NRB & CECI (2008). Micro-financing towards Empowerment of Disadvantaged Groups in Nepal: Innovations and Practices

Table 3: Summary of some donor-funded programmes/projects and financing mechanism

Programme/ Project	Duration	Donor/ Implementing agency	Allocated Budget (USD)	RETs supported	Financing Mechanism (including innovative financing)- current or potential
National Rural and Renewable Energy Programme (NRREP)	2012-2017	Danida, DFID, NORAD, KfW, SNV, UNDP, ADB, WB/ AEPC	184 million	All	Subsidy (output based) Biogas Credit Fund (BCF)- Wholesale lending to partner institutions of AEPC (cooperatives, financial intermediary NGOS, Microfinance development banks, community forest users committees) Micro-hydro Debt Fund Support for Carbon Finance Risk insurance mechanims (Through Central Renewable Energy Fund-CREF, USD 113.5 million)
Scaling Up Renewable Energy Programme in Low Income Countries (SREP)	2012-2017	WB, IFC, ADB, Norway, the Netherlands	40 million	Solar PV, mini/micro-hydro, small hydropower projects, biogas	Grants (upfront capital grants+ performance- based payments such as Output Based Aid, Advance Market Commitment, Conditional Cash Transfer) Concessional loans & equity Carbon markets Debt revolving fund Partial credit guarantees: Model used by ESAP. Operated through Deposit and Credit Guarantee Corporation (DCGC) guarantees 75% out of the outstanding loan balances and charges ESAP a premium of 2-3% on the RET portfolio balance Risk-sharing facilities/Guarantees: Guarantee instruments are used to improve conditions for investment in, or lending to, projects by mitigating risks that lenders and investors would not be willing or able to accept. Loan guarantee- covers loss on account of debt service default for lenders up to an agreed portion of the actual loss. Applicable for financial institutions providing debt Contingent finance disbursed to the Contingent finance disbursed to the project upon underperformance of a renewable energy technology and where such risk is not commercially insurable at reasonable costs or has occurred beyond the period for which commercial insurance is available. Vendor financing Credit fund (Biogas Credit Fund) Credit Delivery model: Partner banks lend directly to end user at interest rate of 14 % Partner banks lend to end user but via agent or local finance institution (LFI) (cooperative). Agent will act on behalf of bank for paper work and to collect loan installment. LFI borrows loan in wholesale from partner bank and acts as retail bank for users. This is considered appropriate for financing solar PicoPV. Provision to explore other innovative tools and results based financing such as Output based aid (RBF), Advance Market Commitments (AMCs)

Programme/ Project	Duration	Donor/ Implementing agency	Allocated Budget (USD)	RETs supported	Financing Mechanism (including innovative financing)- current or potential
CleanStart	2012-2015	UNCDF, UNDP	13 million	*	Risk-capital grant to cover up-front cost market research, product development and roll-out, product marketing, upgrading system and for designing of appropriate results-based incentives. This will be provided only to the selected high performing financial service providers Performance-based Agreement (PBA) Provision to provide additional Risk-capital grants for innovation to develop and piloting of new business models such as carbon finance, loans for productive end-use, household utilities or community-based systems enterprise loans for local energy retailers or manufacturers Concessional loans Pay-as-you-go schemes Exploring strategies for introducing clean energy financing
Renewable Energy for Rural Livelihood (RERL) Bridging programme	2011-2013	WB, UNDP	1,508,150	ICS, Solar PV, Community electrification, biogas,	Carbon financing Micro-finance Explore new financing mechanisms
EnDev (Energizing Development)	2009-2015	Consortium of donors (DFID, DGIS, AuSAID, etc.)	NA	Mini/micro hydro	Debt Fund (implemented by 2 commercial banks- Himalayan Bank & Clean Energy Development Bank) Vendor financing (MFIs as local agent of commercial banks) Exploring innovative and results based financing mechanism
Improved Cook stoves Programme	2012-2017	SNV, AEPC/CRT/N, RDSC	DGIS	ICS	Carbon financing

Note: *These programmes have been/will be implemented within the framework of NRREP*

Source: *i) CleanStart Detailed Business-Plan-Nepal; ii) AEPC/NRREP (2013). Annual Progress Report (16 July 2012- 15 July 2013); iii) Sharma, V.D (2010). A dozen innovative renewable energy technologies; iv) The GEF Small Grants Programme; Scaling-up Renewable Energy Programme-Investment Plan for Nepal; v) Improved Cookstoves Programme with Carbon Finance- http://www.crtnepal.org/index.php?option=projects&pjid=393032303239 vi) RERL project document vii) CleanStart- detailed business plan, Nepal*

Out of the innovative finance mechanism/instruments envisaged by above listed programmes, the following are noted to be currently in use:

2.5.1. Vendor financing

In this model, vendor acts as intermediary between its customers and the bank. The vendor gets working capital from the bank and then recovers it through cash and credit sales to end users through collection of regular installments. In Nepal, Clean Energy Development Bank (CEDB) applies the vendor financing model to household biogas plants. It provides working capital loans to biogas vendors registered under the Biogas Support Programme (BSP). Rural and Alternative Energy Pvt. Ltd, Tanahu district has been reported to follow vendor financing approach.

Pros

- The money disbursed is used for the manufacture of the RET devices and not diverted for other purposes.

Cons

- Vendors do not have expertise in credit assessments.
- Consumers may find the process to lack transparency

2.5.2. Carbon finance

Under the Clean Development Mechanism (CDM) of the Kyoto Protocol, GHG emission projects in developing countries earn carbon credits or Certified Emission Reductions (CERs). These can be sold to developed country parties mentioned in Annex I of the UNFCCC for whom it is obligatory for reducing their emissions below their 1990 levels. The RET based projects and programme of activities (PoA) like promotion of ICS, Pico PV or community electrification through micro hydropower projects would be eligible under CDM and a small number of such projects have been registered by the CDM Executive

Board. The income from sale of CERs could be pooled into a fund and can be used to bring down the contributions of the owners of the RET devices. The CDM Project or PoA entails certain obligations, like monitoring the performance of the devices, on the users.

As of today, Nepal has two registred Programme of Activities (PoA) in RE: ICS Iand biogas. Various NGOs, private and financial sectors in Nepal have implemented projects that relates to carbon finance. For example, SNV has been implementing a Improved Cook Stoves (ICS) Programme in 7 far west districts of Nepal with carbon finance. Similarly, WWF Nepal has developed and implemented voluntary project in domestic biogas. Moreover, Ace Development Bank became the first commercial bank in Nepal to purchase voluntary emission reduction or carbon credit of 2000 ICS to promote RE from Rural Mutual Development (RMD), a Dhading based NGO, to offset its carbon footprint.[37] The revenue generated from this carbon financing is planned to be used for further promotion of ICS.

Pros

- End users receive share of the revenue
- Potential revenue source for financial service providers and energy companies
- Acts as incentives for supplier to monitor quality for RET

Cons

- The price of the CERs have drastically fallen (from 10-15 Euros to 0.2 – 0.3 Euro) during the past two years due to the change of position by the main purchaser, EU. This has, therefore, diminished the attractiveness of the carbon finance.

37. http://www.ace.com.np/?page=right-climate-to-trade-arbon&modee=Information

- There exists knowledge gap as most of the RE sector stakeholders do not have proper understanding of how carbon finance works.
- It requires specialized knowledge of rules and regulations.
- Low carbon revenues as compared to the time and effort invested for registration and verification.

2.6. Financial institutions in RET financing

Currently, private financial institutions in Nepal are also facilitating the access of different RETs, whichever they consider as bankable. For example, the Clean Energy Development Bank has financed 650 biogas plants in the past 2-3 years through vendor financing. Similarly, it is also financing micro-hydro projects, most of which are community-owned. Micro-finance institutions and cooperatives are also providing RETs loans/credits. Over 400 MFIs are financing RETs and have defined it as a separate loan product . Commercial banks, however, are least involved in RETs financing for reasons mentioned in Section 2.7 (b, i), though some are doing so by collaborating with local MFIs. Some of the financial institutions currently providing credit in this sector are provided in the table below.

Table 4: Some financial institutions financing RETs in Nepal

Financial Institution Type	Name of financial institution	Service provided in RETs	Amount
Commercial Banks	Bank of Kathmandu	Micro finance SHS in Rolpa District. EVs Biogas	NPR 1 million for SHS
	Himalayan Bank Limited (HBL)	Process change, technology up gradation Micro-hydro	NPR 24.65 million
	LAXMI	SHS	NA
	NABIL	Micro-hydro Financed Rice Husk Turbine to replace Diesel generator in Ghee, oil and soap industries	NPR 4.7 million
	ACE	Solarification of Hotels SHS Sola Tuki	N/A
	Agriculture Development Bank Limited (ADBL)	Micro Hydro Power Biogas Solar	N/A
	KIST Bank	Micro-hydro Provides loan to: Micro Finance Development Banks. Financial Intermediary NGOs (FINGOs). Rural Co-operatives	NPR 6.2 million (NPR 20 Million -Loan may be considered without real estate collateral back up)
	Kumari Bank	Micro-hydro	NPR 8 million
	Nepal Bank Limited	Biogas	
Development Banks	Clean Energy Development Bank (CEDBL)	Replacement of diesel boiler (5000 liters) with solar thermal in Grand Hotel VSBK project in Birtamod, Jhapa Financed CFL Trading and Suppliers	N/A

MFI	Nirdhan Utthan Bank(Micro Finance Development Bank)	Biogas	maximum size of loan NPR 20,000
	Deprosc Development Bank	Micro Enterprise loan	initial maximum loan size up to NPR 150 thousand
	Chhimek Bikas Bank	Biogas , solar Micro Enterprise loan	NA
	Grameen Bikas Bank (in 5 development regions) Purbaanchal Grameen Bikash Bank & Paschimanchal Grameen Bikas Bank	Provides cost effective micro finance services to the poorest of the poor people and deprived population RET/biogas	NA
	Laxmi Laghubittiya Sanstha	Alternative Energy (AE) Loan	Max NPR 30,000 without collateral & NPR 60,000 with collateral
	Swabalamban Bikas Bank	RET	NA
	Karnali Savings and Credit Cooperative	Biogas	NA
	Sahara Savings and Credit Cooperative	Biogas	NA
	United Bikas Bank	Biogas	NA
Wholesale Lending Institution	Rural Micro Finance Development Center (RMDC)	RET	NPR 411.8 million
	Rural Self- Reliance Fund (RSRF)	Biogas	NPR 125.5 million
	Small Farmers Development Bank (SFDB)	RET	NPR 864.1 million

Source: *Website of listed banks; Report on Energy Finance Market Study IFC Nepal; NRREP annual report*

2.6.1. Opportunities and challenges in selected RET financing in Nepal

a. Opportunities

i. Given the energy demand of the country, growing awareness on climate smart/energy efficient project and RET innovations, there is significant increase in opportunities for different private and public sector business financing.

ii. The government on Nepal has a long term vision where every household has at least one renewable energy-based energy system installed by 2020. For this the government envisages investments of worth USD 1,076 million in renewable energy.[39]

iii. The rising financial commitments from various development partners, international programmes and government clearly indicates strong growth of RE sector. Moreover these actors are now focusing on market driven approach and business development for RE thereby creating an enabling environment for private sectors.

iv. NRREP, a framework program being executed by AEPC, has set a target for 475,000 ICS with annual target of more than 100,000 ICS and community electrification for 150,000 households with annual target of 18,000 HHs.[40]

v. Similarly, Global Alliance for Clean Cookstoves (GACC) aims for clean and efficient stoves and fuels for 100 million households. It also encourage private sector investment and investment brokering between green or impact investors and local private sector

39. Cleanstart Nepal detailed business plan

40. Annual Progress Report NRREP (2012-2013)

41. Background Paper For Clean Cooking Market Place July 2013, Nepal. SarojRai, SNV based on Census 2011 figures

for clean and efficient stove and fuel market development. Nepal is most likely to be included as a priority country for GACC.[41]

vi. The potential market size for ICS for rural rich and rural middle class is 472,000 households and for rural poor it is 3,298,931 households[42].These are attractive numbers to engage with from both business and development perspectives.

vii. The motorized access to remote and inaccessible areas of the country, where most poor and therefore most of the potential small RET users live, is gradually improving. For example, the number of districts inaccessible by road has reduced to two from five until few years ago. Rural roads network is improving, connecting large number of villages. There is still more work to be done as quality of transport is still very basic and areas to be linked by road are still large.

viii. The quantum of deprived sector lending was NPR 33,088 million as of January 2013. Each year this figure is increasing with annual additions as all the banks have to lend between 4-4.5% of their total loans to the deprived sector. Even if a small part of this is utilized for RETs, large fund will be available on comparatively softer terms.

ix. The demonstrated features of MFIs like outreach, profitability and good performance indicator, in addition to having access to a very mature financing market supports them in catering financing to rural and poor communities.

b. Challenges

42. Background Paper For Clean Cooking Market Place July 2013, Nepal. SarojRai, SNV based on Census 2011 figures

i. One of the major barriers for financial institutions in financing RETs in Nepal is the physical one arising from remoteness and difficult topography of many areas of the country. This essentially limits the outreach of financial institutions, especially true in the case of commercial and development banks. Even if they have massive geographic outreach, the small transaction amount of the RETs, which they consider unattractive or non-bankable, would be a major reluctance factor in financing RETs. For example, many commercial banks consider financing RETs, including micro-hydro, as unattractive, primarily due to their small transaction size and also because of other factors such as securities, financial viability, and their lack of knowledge on RET.[43]

ii. Microfinance institutions, on the other hand, have wider outreach and they deal with smaller transactions. However, they still have their own limitations. For example, they may find financing some RETs unattractive due to their low cost, as in the case of mud ICS, while on the other hand financing micro-hydro projects is typically beyond their capacity.[44] Saving and credit cooperatives are able to deal with smaller transactions and their presence is also much wider.

iii. Renewable energy financing is a relatively new product for MFIs. Though it has a high potential market, MFIs who have extended credit to energy needs have not had any significant impact or scale. Limited growth of lending portfolio within the existing client base and lack of familiarity and perceived high risk are some of the factors which need to be addressed so that MFIs readily enter this market.[45]

43. Wegstein, M. (2010). Potential of Solarhome systems,Biogas-plants and Micro-hydro in Nepal and Opportunities for MFI. AEPC/GON

44. Based on consultations with key stakeholders in Kathmandu, 2013

45. CleanStart Detailed Business Plan-Nepal

iv. Many financing institutions are not fully aware about technical aspects of RET and associated risk, subsidy programs, and ways to package the loan with other products etc. As a result there is apprehension of high risk level while investing in RE sector.

v. Accessing loans at local level is not institutionalized. Often the land holder certificate is kept as collateral while borrowing loan from the banks by the chairperson/treasurer of the micro-hydro user groups. This puts pressure on the owner of land with fear of losing land. There are also practices of high valuation of land put as collateral and other fiduciary risks. A single person will be accountable/suffer if the group is not able to repay.

vi. Banks in rural areas are often hesitant to work with poor HHs or with financially weak cooperatives which are not legally bound and might have a problem with guarantee of repayment.

vii. Sometimes, the size of RET cost or investment may not be suitable for MFIs and banks. For example, for micro-hydro project in rural areas, people need a credit of around NPR 2 to 3 million rupees for 50 kw plant, which is a small amount for the bank and big for MFIs.

viii. As compared to micro-hydro, the size of investment in Solar Pico PV or Pico PV and ICS seems unattractive for banks.

ix. There is increasing migration from rural to urban areas, and this is fuelled by the increasing remittance injected into the rural communities. The impact of this is reflected

in the migrating households using national electricity grid and LPGs for their household energy needs. This is shrinking the population using small RET applications to very poor groups and fewer in number.

x. There is general absence of awareness among end-users about various RETs, benefits of using clean energy and financing opportunities. As a result, the scaling up of the RET usage is still likely to take time.

xi. CREF fund is yet to be functional and its effectiveness is yet to be evaluated.

xii. The country lacks clear energy policy, electricity policy, regulation on energy sector, and fuel efficiency regulation. In the absence of this, there is general hesitation among the financing bodies to involve in larger scale financing modalities in an undeveloped and unchartered areas that RET are often perceived to be.

CHAPTER 3
NEPAL'S READINESS FOR INNOVATIVE FINANCE

3.1. Introduction

Nepal has a relatively well structured financial sector that reflects its small scale economy and its priorities. It has been an experience worldwide that home grown financial solutions are sustainable and widely acceptable. Therefore, it is essential to consider existing modalities and economic framework while suggesting financial mechanisms / modalities for promotion of RETs in Nepal. While considering innovative financing options for the RETs, these existing operational financial models are crucial as the likelihood of acceptance through them will be high. Hence, an assessment of the readiness of renewable energy financing in Nepal is necessary. Assessment of readiness in Nepal has been done based on the current financial situation and innovative financing instrument/ mechanisms described below.

3.2. Readiness status

Currently, the main instruments of financing of the identified RE technologies so far have been subsidy from AEPC and users' contribution in the form of own savings and loans from friends and relatives. Although some of the tools described in earlier sections have been increasingly used in the country, these have largely been limited to urban and peri-urban areas. The remote locations of the hilly regions have neither been adequately served by RETS for cooking nor electricity grid or for lighting. In case of community electrification, the main source of financing has been subsidy. In this situation, there is a tendency to compare any new and innovative instrument that may be introduced with the conventional ones, especially where higher contribution from users is expected that too up-front. In this context we describe the status quo of the innovative financial instruments in Nepal.

3.3. Status of Results-Based Funding (RBF) instruments

In this context of low penetration into rural areas, the study sought to assess the applicability of Results-Based Funding instruments besides the conventional financing mechanisms. During the meetings with Kathmandu stakeholders, the study noted that the bilateral and multilateral agencies are preparing for introduction of many RBFs in various parts of the world, including Nepal. However, in the latest tenders, none of the projects or programmes in low carbon project activities is known to be covered under RBF instruments. For example, the UK Government Results-Based Financing for low carbon energy access (RBF) tender[46] includes programmes in Benin, Ethiopia, Rwanda, Tanzania, Bangladesh and Vietnam. The Energy+programme is also planning to include RBF under its Phase III slated for 2016 according to the Country Partnership Strategy.47 According to the partners of the Energy+Programme, although there is significant experience of using RBF in sectors such as health, energy sector experience is primarily limited to around 50 projects targeting pro-poor service delivery, such as the installation of solar home systems. Recognizing that RBF has not been widely applied in the energy sector, a key near-term objective is to expand the range of RBF modalities to assess their effectiveness and then scale up successful approaches. An area of particular interest would be market-focused instruments that aim to catalyze private sector delivery and self-sustaining business models, as opposed to capital support for public service delivery. This suggests an initial focus on opportunities related to energy access, distributed renewable energy, and energy efficiency; large scale electricity generation is perhaps better supported through instruments such as feed-in-tariffs and regulation. This study notes that Advance Market Commitments could be one of the RBF instruments that may be suitable for piloting in Nepal.

46. https://www.gov.uk/result-based-financing-for-low-carbon-energy-access-rbf

47. http://www.regjeringen.no/upload/UD/Vedlegg/energi/energyplus_partnership.pdf

Based on the interactions with key government departments/institutions, international (Bilateral and Multilateral) organizations, NGOs and industry federations, this study identified the following instruments or mechanisms of innovative finance oriented towards renewable energy technologies and devices.

3.4. Mechanisms/ Instruments of innovative finance for RE

a. Savings and Credit Cooperatives (SACCO) model

Under the SACCO model, it is proposed that the SACCO will act on behalf of the households to apply for AEPC's subsidy for the RETs, identify and select manufacturers/ vendors of the RETs. SACCO will either use the savings of the concerned HHs to bring about the own contribution or extend loan for the purpose. SACCO will supervise the installation of the devices and manage the maintenance of these over a pre-decided period of time. Thus, the villagers have only to make savings from their income and the rest of the facilitation is coordinated by the SACCO. The schematic in Figure 12 below illustrates the suggested mechanism.

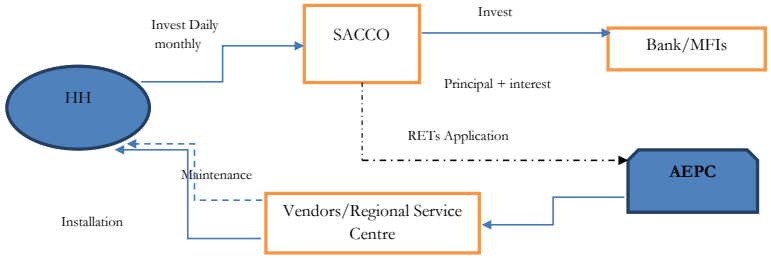


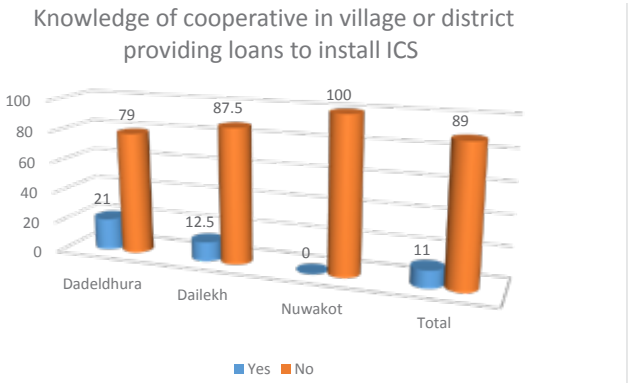
Figure 12:
SACCO (ICS and Pico Pv)

In the proposed SACCO model, households can go for monthly or daily saving, which will be deposited into a dedicated accounts for the project. The SACCO can invest this deposit into their preferred bank or MFIs and eventually the principal amount with its interest can be invested by SACCO for procuring RETs applications/devices.

As stated above, SACCO will also be responsible for securing the AEPC's subsidy and installation and post-installation care of RETs solution can be managed by the pre-qualified regional services centres of AEPC.

Feasibility of SACCO Model:

Figure 13



According to statistics published by the Department of Cooperatives Nepal as of 2070 BS (2013 AD) there are 29,526 cooperatives in Nepal, of which 12,916 are Savings and Credit Cooperatives. Of these, 411 cooperatives are dedicated to the renewable energy sector. However, the geographical distribution of these cooperatives is not wide as many of the surveyed households were not aware of such cooperatives and its presence in their VDC area (See figures 13 and 14).

However, more than 96% respondents were positive on the idea of taking loan from

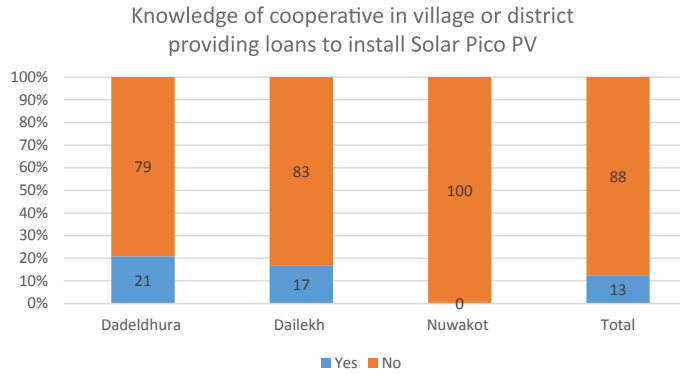


Figure 14

SACCO for RET and the findings on their willingness to take loan from SACCO is uniformly found in the surveyed districts. (figure. 15).

b.Micro-Finance Institutions (MFIs) Model

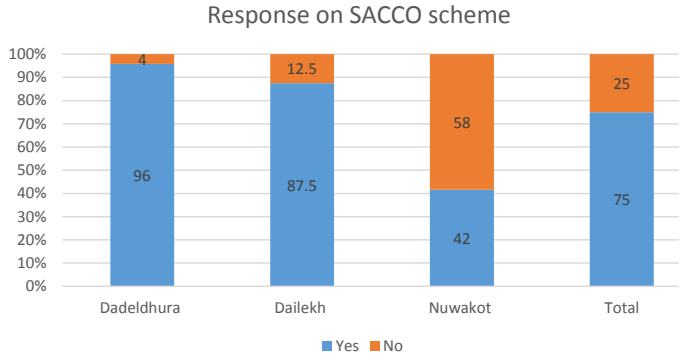


Figure 15

A concept similar to Savings & Credit Cooperative is the MFI. The difference is in the ownership and the promoting entity. While the cooperative is promoted by the members coming together, MFI may be formed by individuals or institutions/organizations. MFIs may be for profit or not for profit organization. The NRB regulates the MFIs in Nepal by issuing licenses and supervising them. MFI may raise their funds through deposits from people or take bulk loans from the commercial banks. In Nepal, MFIs credit to the

RE sector has not grown much. Of the few programs, AEPC operates the Biogas Credit Fund financed by KfW. It is a revolving fund with credit delivery through MFIs, many of which are cooperatives. The AEPC lends to MFIs at 6% p.a. interest rate, which is then on-lend to consumers at an interest rate not exceeding 14% p.a. Of the 6% charged by AEPC, 2% goes back to the Fund, 1% to MoF and 3% used as management expenses of BCF[48]. AEPC monitors participating MFIs who are required to finance at least 10% of their loan amount with matching funds. This study notes that there is potential for MFIs to play a significant role as their outreach is quite extensive and with government promotional initiatives, they will expand to the remote hilly districts in the future. The MFIs and SACCO models are more suitable if they can source inexpensive funds. The NRB's policy states that at least 4.5% of total loans issued by commercial banks must go to deprived sectors. The figures for development banks and finance companies are 4% and 3.5% respectively. The portfolios of financial institutions including commercial banks, development banks and finance companies contain NPR 31.5 billion under the designated deprived sector loans, by mid-March 2013, according to the NRB's monthly financial statistics. As of January 2013 the aggregate commercial lending by banks in Nepal amounted to NPR 887,263 Million and aggregate loans to the deprived sector was NPR 33,088 Million. The NRB has included support to alternative energy technology based devices under this category. Thus, if a concerted effort is made to channel funds into RETs, the poor population striving for access to basic energy would benefit from such investments. This loan can be provided at minimal rates of interest. Through a network of bulk lenders and MFIs it is possible to provide loans to the HHs with collaterals like the charge on ICS. Interest buy-ins by using international donors' funds or assistance from the upcoming CREF is also possible. This model of leveraging the DSL funds for low carbon growth projects is illustrated in the figure 16 below. For this mechanism, a syndicating agency for aggregating the funds available under DSL needs to be formed

48.Government of Nepal, SREP Investment Plan for Nepal September 2011 (para 139 pg 36)

and authorized by the NRB. This agency can play various functions that could be helpful for SACCO, AMC and Project Finance Models.

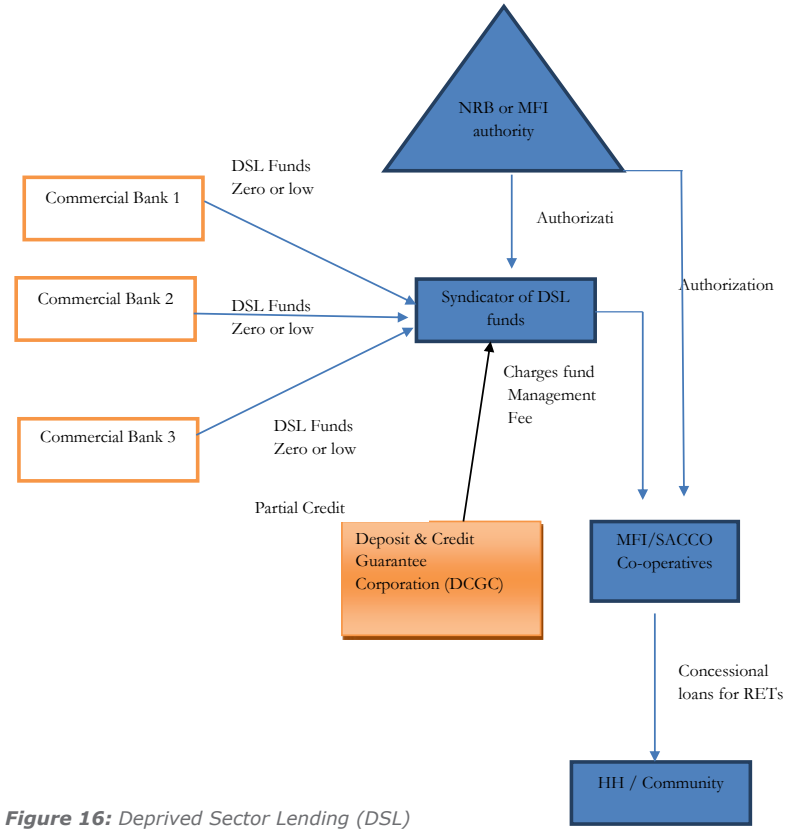


Figure 16: *Deprived Sector Lending (DSL)*

As shown in the present study and another by AEPC, awareness about presence of MFIs and deprived sector lending is poor (figure 17). Also MFIs procedures are perceived to be cumbersome. Also, the MFIs do not have any experience in appraising RET devices/ projects and their financial products are not oriented towards RE projects. These need to be corrected in order to channelize a large stream of funds available from commercial banks under the deprived sector lending. AEPC may take a significant proactive role in this so as to gainfully utilize these funds.

In the survey, it was found that the awareness of households about the compulsion on banks to invest part of their loans in the deprived sector, which includes rural energy was poor (figure 18).

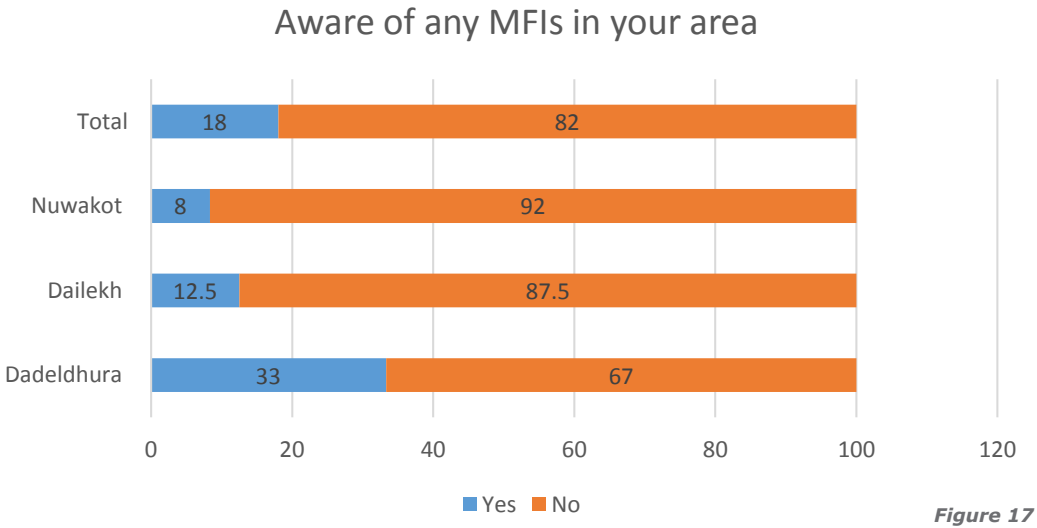


Figure 17

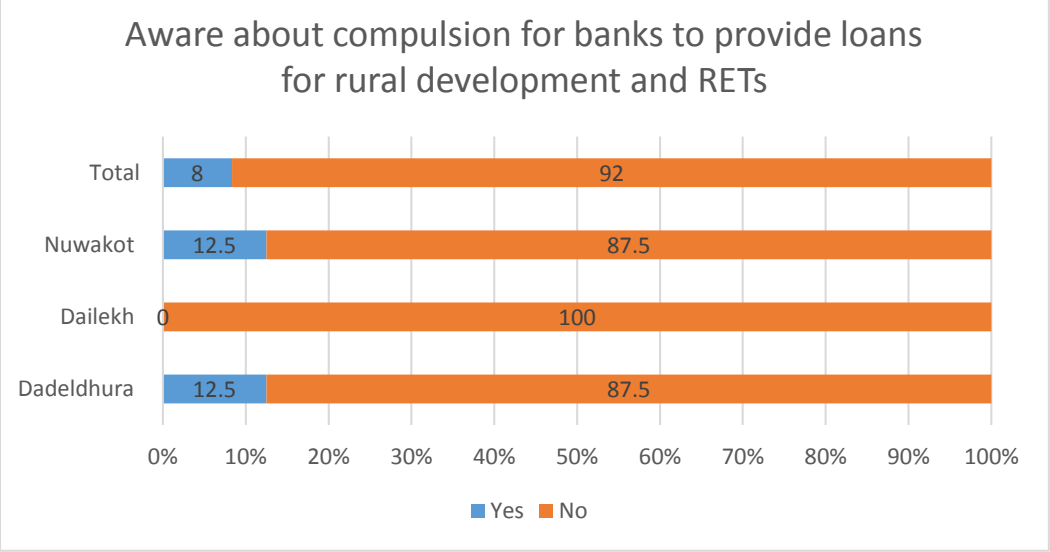


Figure 18

c. Project finance and Public-Private-Partnerships

This is a financing option applicable to community electrification projects. These projects are based on micro-hydro power and in some cases biomass gasifier/combustion systems. The project investments are medium to high level and there are project risks. In Nepal the domestic investors' capabilities in terms of technical and financial are relatively low and environment for FDI is not yet conducive. Therefore, due to the risks to investments, the investors prefer non-recourse based mode of investments. This is the main tenet of non-recourse project finance or public private partnership modalities. Generally, these

are concessions under Build, Own, Operate & Transfer (BOOT) mechanism where the private sector entity will design, construct, operate and maintain the asset for a pre-determined time frame. During this period, they recover their investments from the project outputs. This model is well established in developed and developing countries. It is possible to introduce the model in Nepal for the community electrification projects.

There are two possible variants under this model; the first could be where the community may own a part of the owners' equity as a joint venture and in the second case it could be a purely Independent Power Producer (IPP) where the private promoter owns the Special Purpose Vehicle company to set up the project. In this model the private promoters' risk is mitigated by various measures. These could be partial or full credit guarantee by the Deposit and Credit Guarantee Corporation (DCGC) of Nepal or if the promoters are from outside Nepal their respective country's export credit agency. The international donors' funds may also be used to build a corpus that could buy-in the interest to certain extent. These are described in the figure 19 and 20 below. The figures of equity etc. are for illustration purposes only.

Additional financial support:

1. Credit Guarantee (Full or Partial) Fund
2. Interest buy-in by donors
3. Carbon finance
4. Escrow account

Essential Features:

Promoter – Good quality equipment, proper installation, performance guarantees, O&M

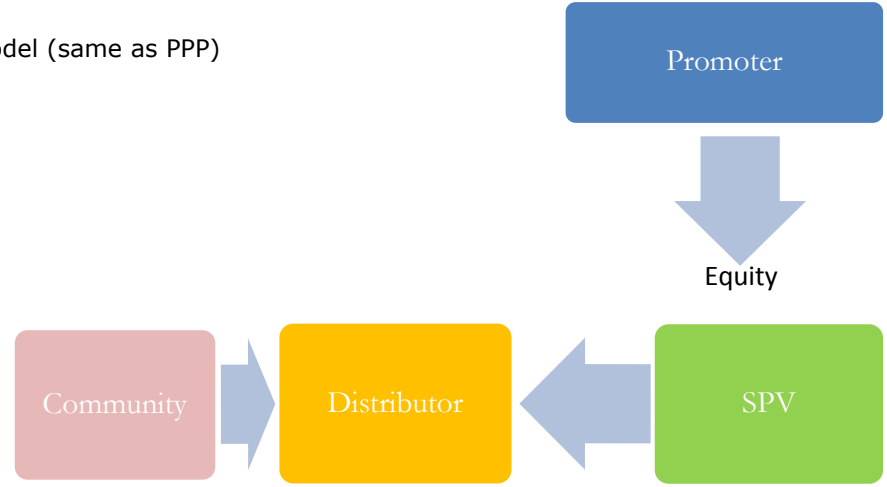
Joint – Proper metering, daytime sale to local commercial ventures at higher tariff

Community – Timely payment of tariff, proper maintenance of HH electrical gadgets

Figure 19: *Project Finance – Micro hydropower project*

Common essential features:
Promoter – Good quality equipment, proper installation, performance guarantees, O&M
Distributor – Proper metering, Day time power sale to commercial ventures at higher tariff
Community – Timely payment of tariff, proper maintenance of HH electrical gadgets

b. IPP Model (same as PPP)



Project Cost - 100

Illustrative Financing

Equity – Promoter – 20

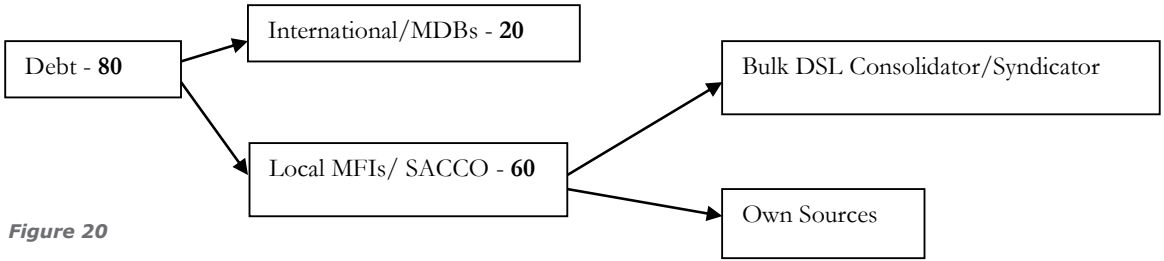


Figure 20

Additional financial support:

1. Credit Guarantee (Full or Partial) Fund
2. Interest buy-in by donors
3. Carbon finance
4. Escrow account

Essential Features:

Promoter – Good quality and efficient Renewable energy technology and its appliances, proper installation, performance guarantees, O&M

Distributor – Proper metering, Day time power sale to commercial ventures at higher tariff

Community – Timely payment of tariff, proper maintenance of HH electrical gadgets

c. Leasing

A traditional method of financing assets is leasing, wherein the actual user does not have to pay the capital cost but pays a monthly rent. In this model a private company can buy the ICS on behalf of the HH and receive the subsidy as applicable from AEPC. It will then take the responsibility of installing the ICS and also periodically maintain it for a rent that enables it to earn reasonable margin. While this is a plausible model, it can be for a limited period as in the end this option will prove to be expensive for the HH. During the survey, this was underlined by some respondents that the rentals charged by the leasing companies should not be high. The response on leasing by the surveyed household is shown in the figure 21 below.

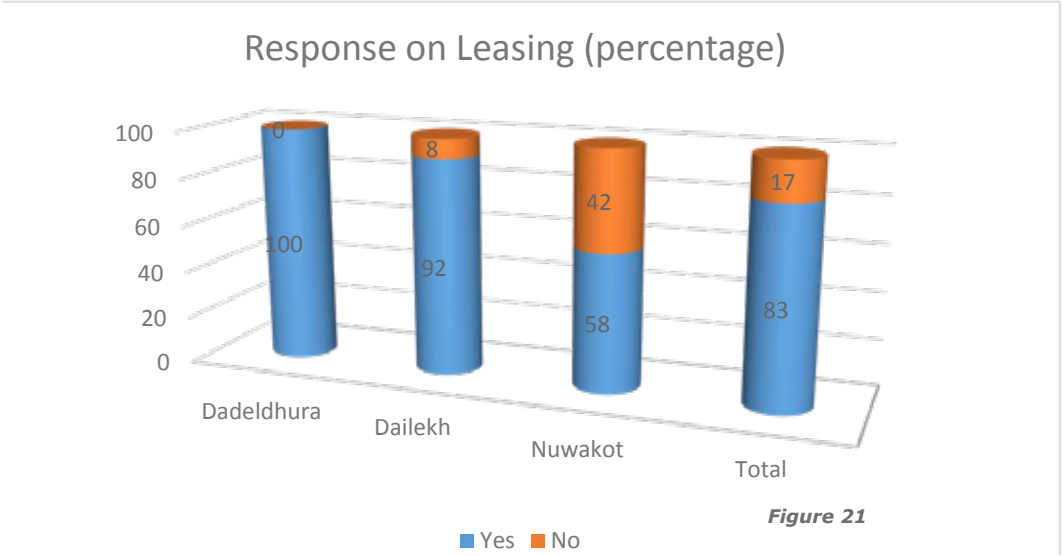


Figure 21

3.5. Assessment of readiness of innovative finance

The above described financial instruments were analyzed with reference to local institutional set up, private sector engagement and interest, development partner priorities and user preference and needs. The analysis is presented in the Table 5 below:

Table 5: Readiness of innovative finance instruments matrix

Type of innovative finance instruments	Local Institutional setup	Private sector engagement and interest	Development partner priorities	Users preferences and needs
SACCO	Large number of SACCOs established. However, activity level for RETs is poor. More SACCOs focused for RET lending is needed. Also awareness creation programs need to be undertaken.	This model is oriented towards cooperation among people. Private sector is not engaged at present. As more SACCOs enter RET activities, private manufacturers, assemblers would get interested.	Many development partners have engaged with SACCOs, e.g. DFID under their SAFAL program. SACCOs should be engaged in more activities promoted by the bilateral/ multilateral aid agencies. Programs like CleanStart, EnDev, Energy+, SREP may get engaged.	Presence of a SACCO nearby will improve HH's access to finance
MFI	Very widely developed sector with large number of MFIs established. However, very few of them promote/lend to RET projects. MFI awareness creation programs need to be undertaken. Technical knowledge about RETs should be imparted to MFIs.	Private sector is one of the beneficiaries of the MFI funding. Easing of loan procedures, lowering of interest charged and flexibility in operation is necessary.	Many development partners are engaged under diverse programs with MFIs. Focused RET based projects involving MFIs need to be promoted.	The users would prefer loans from MFIs as the cost would be lower than loans from friends/family and the private lenders. The loan procedures should, however, must be simple.
SACCO/MFI with DSL	Deprived sector lending has been in practice for long period. However, the share of RETs in DSL lending is paltry. Awareness creation and dedicated institutional effort as suggested is necessary.	Private sector engagement for use of DSL funds is not practiced currently. With the proposed mechanism the fund availability for RETs is expected to rise and more private sector entities will be attracted.	Development partners have identified DSL funding as a source (e.g. SREP), but effort proposed to make use of these funds for financing of RETs is unknown. The suggested mechanism will be definitely of interest to the development partners.	For user this will be very beneficial as the interest rates would be much lower.
Project finance/PPP	Project finance is practiced in large size hydropower projects in Nepal at present. However, it is not known in case of smaller projects. Awareness creation among the communities about benefits of the mechanism should be undertaken.	Private sector engagement is sporadic in the community electrification projects at present. Some case of communities retracting on agreed tariff has been a set back for private sector engagement. Awareness creation should be undertaken to dispel such concerns.	Development partners may be interested as international organizations may also be interested in bundled projects in Nepal. Many programs of the development partners look for non-recourse projects.	The modalities of project finance must be explained to the user communities before and at all stages of implementation.
Leasing	Low level of awareness about leasing mechanism in Nepal, at least for RETs. Awareness creation on this necessary. Banks could consider entering this area.	Not much private sector engagement. Awareness creation programs may be undertaken.	Not a priority of the development partners as this mechanism is not a long term activity.	User involvement and awareness is quite critical in leasing.

3.6. Analysis of the willingness to pay and ability to pay

Willingness and ability to pay are key parameters to determine how the potential users of RETs view the RET in terms of its usefulness to meet their needs, and how they perceive their own economic condition vis a vis the cost of the RET.

When people are willing to pay for a RET, then ability to pay becomes important. Ability to pay or affordability determines whether or not external financial support is needed. This is where affordability analysis becomes relevant.

Affordability, on the other hand, is based on Rate of Interest (ROI) on credits. Many of the respondents in the field survey expressed four main concerns on loans: i) availability of a SACCO/MFI locally, ii) nature of procedures, iii) collaterals sought by the lenders and iv) rate of interest charged.

During the field survey in three districts (Dadeldhura, Dailekh and Nuwakot) the average monthly income was found to be NPR 13960 (range NPR 8,200 – 24,000). The monthly average savings are NPR 5,010 (range NPR 2,300 – 9,460). It was found that 50% of the HHs have already installed ICS, 89% of those without an ICS are willing to have an ICS (figure 22), 92% of whom are willing to pay NPR 500 for a mud ICS and up to NPR 4,000 for metallic ones. Most, however, seek financial assistance in the form of loan and subsidy. It was found that 25% of those who installed ICS in one district and 48-55% of those who installed Pico PV availed of loan to meet their contribution. However, 83 - 100% of these were from family and friends and at high rates of interest ranging from 32 – 48% p.a. As compared to these few who availed loan from SACCO were charged interest at 14% p.a.

The survey show that around 90% HHs have indoor kitchen (figure 23) and only about 13% have spent on kitchen improvement to reduce the smoke problem (figure 24). A high number (69%) of the HHs are interested in kitchen improvements if technical and financial assistance is made available (figure 25) while 36% to 83% HHs expressed willingness to make their contribution ranging from NPR 500 to 5,000.

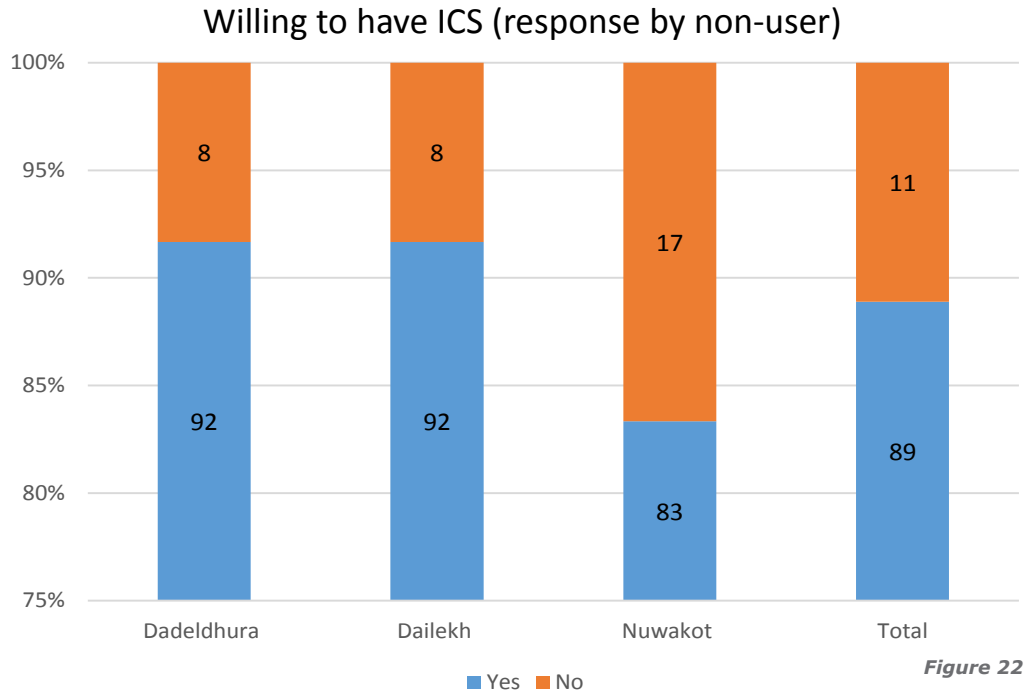


Figure 22

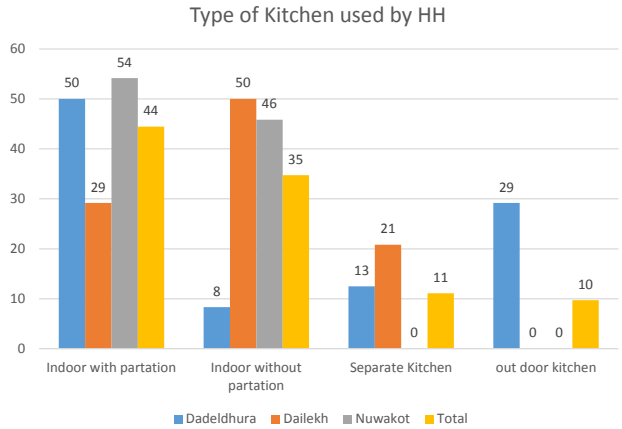
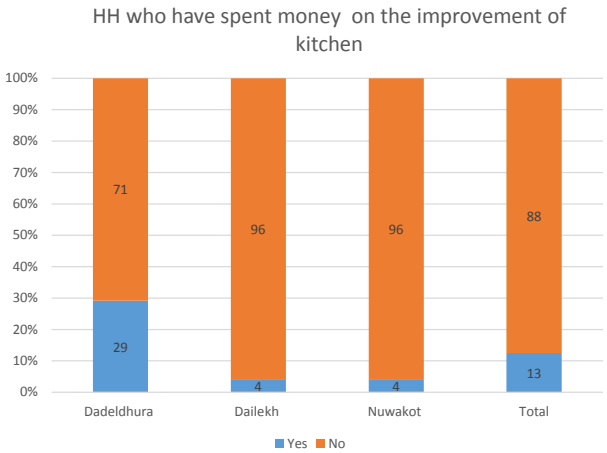


Figure 23

Figure 24



In case of Pico PV systems, it was noted that either electricity (from grid or micro hydro) is available or solar home systems have been installed (figure 26). Around 63% of the HHs who have installed Pico PV systems have found it easy to raise funds for the same 28. Thus, based on the field survey it appears that the HHs have ability to pay for ICS and Pico PV systems but look for technical and financial assistance. They are not averse to avail loans from SACCO and MFIs provided their procedures are easy, they are reachable locally and charge moderate interest rates.

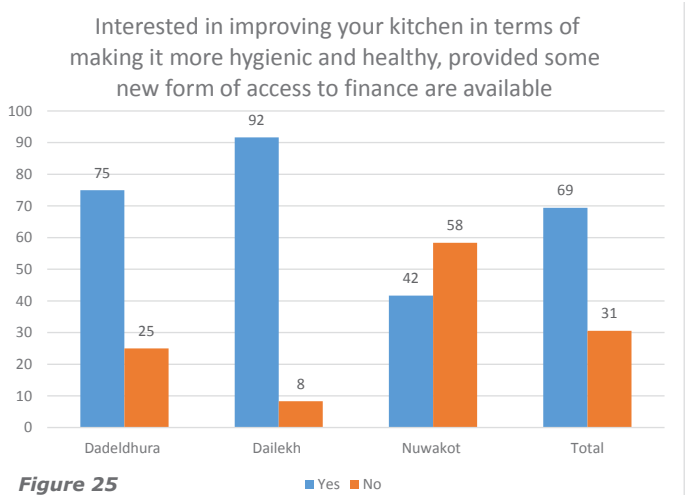


Figure 25

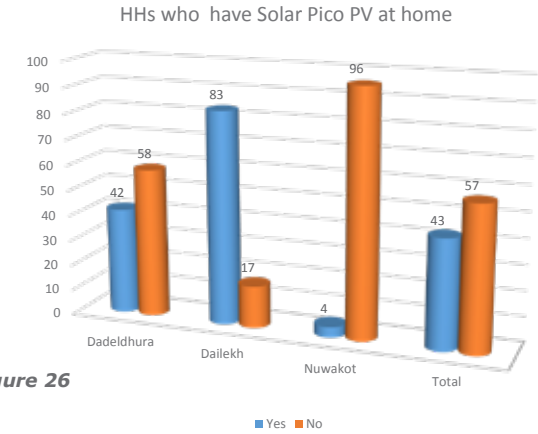


Figure 26

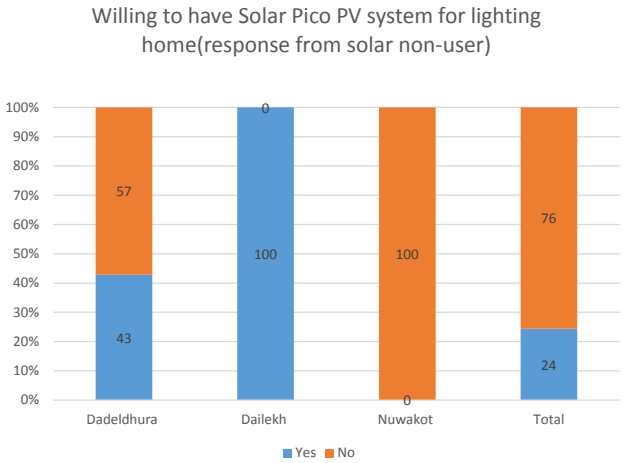
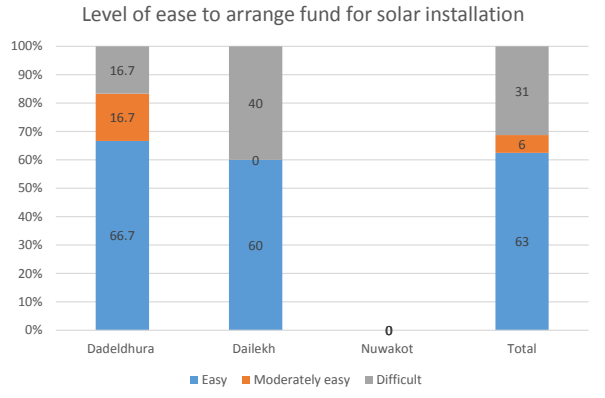


Figure 27

Figure 28



3.7. Analysis of feasible Innovative finance model for ICS for Nepal

3.7.1. Mud ICS

Characteristics: Constructed mostly by the users themselves. Low capital cost but has lesser life.1, 2 or 3 pot holes. Cost ~ NPR 500 – 1000.

Current Financing: Entirely by the HH

Possible Innovations:

a. Training of the people in efficient ICS through community level program with AEPC support. This could be provided in the form of output based aid to private sector or to individual expert masons after demonstrating the training provided. The survey supported this aspect as many HH respondents said that they can bear the cost but need more training on construction as well as new materials.

b. Saving and Credit Cooperative (SACCO) model – Villagers contribute small amount daily or monthly to their account in the SACCO. The SACCO in turn invests the villagers' savings in a bank/MFI at the district headquarters. The saving also earns a small interest. The cumulative deposit for a period of 2 or 3 years is then used to construct a mud ICS. This can be facilitated by the SACCO who hires professionally trained masons to build the ICS at the SACCO members' house. They also maintain the ICS for a specified period. The saving at the SACCO continues and the deposit can be utilized for maintenance costs or to finance the new ICS on expiry of life of the mud ICS. During the survey people expressed more faith in SACCOs rather than banks as they felt they understand the local problems better and the credit disbursal is faster and has less hassles compared with MFIs and banks.

c. Technical innovation: Currently, AEPC does not consider mud ICS for capital subsidy as the life of the stove is three years or less and the transaction size is too small. A technical innovation is necessary wherein the ICS will be constructed out of firebricks by trained masons. These masons could also provide training to the persons in the HH. The firebricks will withstand higher temperatures and stress and would last longer. The cost of these would be higher than the mud bricks and lenders and MFIs may be interested in the deals. The AEPC may take lead in the development by engaging national universities with support from other countries such as India. In VDC in some districts, the respondents pointed to some drawbacks of metallic ICS like dependence on outsiders and life of the MICS not being as long as claimed. In view of this, if a design option that is technically sounder than mud ICS but which can be constructed locally will be more likely to be accepted.

3.7.2. Metallic ICS

Characteristics: Made of cast iron/ steel with thermodynamic design. Relatively high capital cost but lasts longer than the mud ICS. Cost ~NPR 7000 – 7500

Current financing: ~40% - 50% subsidy provided through the vendor, balance borne by the HH.

Possible innovations:

a. Carbon finance: SNV has developed a Programme of Activities (PoA) under which CDM Programme Activities (CPAs) for installation of metallic ICS would be included. From the PoA documents it is noted that each ICS will generate emission reductions of about 2.5 tCO2 annually. These would generate ~USD5 (NPR 500) per year (@USD2 /tCO2). In the crediting period of seven years, the ICS will thus earn NPR 3500. This

could be used to pay the contribution of the HHs for the ICS. The ICS user, however, has to adhere to the implementation of practices specified in the PoA DD and to the monitoring procedures. During the survey most respondents have expressed willingness to participate in CPAs.

b. Advance Market Commitment model: The leaders in the community (e.g. VDC chairperson) may unite the HH owners and give assurance to the vendor selected based on quality and service that all or majority of the HHs will buy the ICS from them. In case the direct commitment is not acceptable, these could be in the written form through an independent agency such as AEPC. This will help reduce the market risk for the manufacturers thereby bringing down the cost to a certain extent. During the survey the respondents expressed willingness for this subject to adherence to quality and performance standard by the bidding vendors.

c. SACCO model: The model described previously can also be practiced in case of metallic ICSs. The saving levels from individuals would be higher. These savings along with the interest thereon would be used to raise HH contribution. The assurance of the SACCO would help address risks the vendor faces in the transaction. While the respondent HHs in the survey expressed support of the model, awareness of presence of SACCOs in the VDC or district is poor. In case the SACCO is ready to offer after sale maintenance services, their acceptance is higher. The SACCOs can also be covered under the deprived sector lending funds as described earlier.

d. Deprived sector lending by MFIs: As explained previously, a part of the large amount of funds available from the DSL pool of funds from commercial banks can be used to provide credit for the ICS loans. The aggregation of these funds can be done by financial intermediaries authorized by the NRB. These MFIs can offer cheaper loans from these funds.

e. Income generation model: The ICS is expected to reduce the wood consumption by a third over the conventional cookstove, leading to time saving in gathering the wood. It will also reduce indoor air pollution and the medical expenses owing to the bad health effects. The increased productivity and time availability can be gainfully utilized in activities that provide additional income to the family. This could be through cottage industries for manufacturing home-made processed food (e.g. papad, pickles) or processing honey etc. While this is not a financial instrument per say, it will improve the savings of the HHs and communities which in turn will improve their creditworthiness for availing and servicing loan or other financial products. This income will reduce the loan portion and also reduce risks faced by manufacturers. During the survey, the respondents welcomed the concept of income generating activities to raise their creditworthiness in general (figure 29). They suggested many more activities that are possible in most of the VDCs.

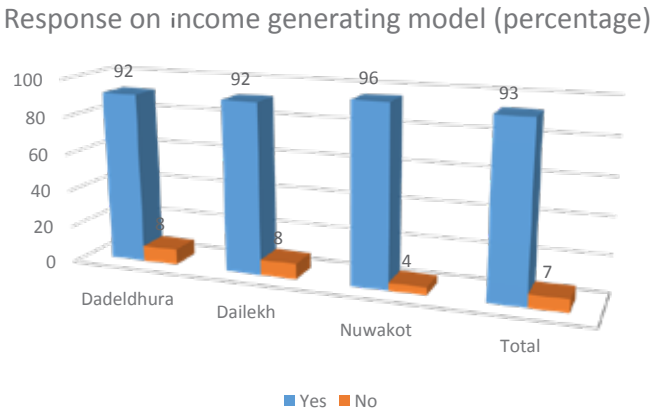


Figure 29

f. Leasing: Another traditional method of financing is leasing wherein the actual user does not have to pay the initial capital cost but pay a monthly rent. In this model a private company can buy the ICS on behalf of the HH and receive the subsidy as applicable from AEPC. It will then take the responsibility of installing the ICS and also periodically maintain it for a rent that enables it to earn reasonable margin. While this is a plausible model, it can be for a limited period as in the end it will be expensive for the HH. During the survey this was highlighted by some respondents that the rentals charged by the leasing companies should not be high.

3.8. Analysis of feasible innovative finance model in community electrification for Nepal

Community based micro hydro projects are funded through member equity in cash or kind ('sweat equity'), subsidy support and loans from MFIs. However, access to term loans, particularly for the larger mini hydro projects, has become limiting factor for scaling up.

Characteristics: Electric power generation systems of capacities between 10kW to 100 kW based on micro hydropower, biomass power or winds depending on availability of RE source are generally qualified for community electrification. The capital costs are dependent on the technology, type of equipment etc. More prevalent among these is micro-hydro power project whose capital cost ranges from USD 3700/kW to USD 4000/ kW depending on the head of the run of the river (RoR) scheme. Thus a 50kW micro hydropower project will cost approximately 20million NPR Being RoR and water being available almost throughout the year, the capacity utilization factor of these projects is high.

Current financing: Comprises government subsidy, loan from banks, MFIs and multilateral development banks, equity and other funding like grants from development aid.

During the survey it was found that increasing electrification through expansion of national grid has caused some local issues where the micro-hydro based community electrification projects were earlier implemented. The HHs who have to pay less monthly tariff for electricity through national grid also demand the same tariff from the micro hydro project. There have been some instances of defaults or difficulty in managing loan repayment by such project promoters to their lenders. In view of this, the government may consider either providing the difference between the project tariff and grid tariff to the promoters or revise the PPA and buy the electricity from the micro hydro projects.

Possible innovations:

a. Project finance: In many developing countries project finance modality, which takes into account, the future cash flow from the infrastructure project, is adopted. In this model there is limited or no recourse to the promoters' balance sheet. In case of power projects, it is the revenues from sale of power that is taken into consideration. In case of community electrification projects the consumers of power are bound by an agreement to pay for the power purchased. In this case the community invites private sector power producers to set up the project and the bid with lowest tariff is accepted. In Nepal, it is understood that communities have capped the maximum amount that each HH pays every month. During the survey by the team as well as by other pertinent studies, it is evident that project finance modality is not in vogue in Nepal. Also, there have been instances wherein, the communities have backed out from paying the agreed contribution. This is not encouraging for the mechanism of project finance. It also means that there has to be wider and active participation of the community stakeholders in the design of project finance deals. In some countries viability gap financing has also been provided by the government bodies while giving concessions through project finance deals. This may be considered while implementing community electrification systems through project finance.

b. Carbon finance: Although not a single CDM project or a Program of Activities on micro-hydro or other RE technologies has been registered yet in Nepal, there is a potential for such projects and Nepal being a Least Developed Country (LDC) the credit buyers from EU may still be interested in contracting credits from such projects, albeit, at a very low price. As suggested previously, since Nepal is a LDC, the government may consider entering in bilateral agreements with some Annex I countries. The countries like Japan (JCM) and some EU states (e.g. UK, Norway, Sweden have floated tenders for CER purchase) are providing funding in lieu of carbon offsets.

c. Advance Market Commitments: For AMCs in community electrification sector, a policy at the federal level of government is necessary. However, with innovations such as inclusion of small industries in the mini-grids it will be possible for the communities to provide such commitments to attract the private sector power producers.

d. Income generation activities promotion: A major reason for lack of interest among private sector and IPPs in community electrification is lack of demand. Mere household consumption is not sufficient to guarantee off-take from the projects. Moreover, the capacity to pay is also low without any business activities. Therefore, it will be preferable to explore and promote income generating activities based on the peculiarities of a village and potential. During the survey, the representatives of the community welcomed the idea. The communities are willing to explore business/income generating activities, with possible IGAs as furniture industry, communication center, capacity/skill development (e.g. training of operator for mill and training to blacksmiths), agriculture/livestock activities like broiler chicken farming and fish farming. Although this is not a financial instrument itself, it will strengthen the ability of the communities to support ventures through many mechanisms.

e. Public private partnerships: The communities can promote projects wherein private sector investors can invest money and also undertake implementation of the

projects. The private sector may have a business interest in the village and may agree to sell surplus power to the community at pre-agreed tariff and during specified time in the day. During the survey the community representatives liked the idea as this may also help the income levels of the community. However, they suggested that the private promoters' stake should not be more than 40% and community should have control over the operations.

3.9. Analysis of feasible Innovative finance model in Solar Pico PV for Nepal

Characteristics: Photovoltaic system up to 10Wp capacity for lighting in a home. Cost: NPR 6000 – 7000

Current financing: Own contribution and loans from cooperatives/MFIs and fellow community members at high interest rates.

During the survey, it was found that there are some influencing factors in case of Pico PV systems. It is seen that electrification has taken place in survey districts (either grid or micro-hydro) due to which the HHs get power to provide lighting. For these VDCs the usefulness of Pico PV is negligible. Another observation in survey in three districts was that kerosene lamps are no longer used for lighting purpose, possibly because of lack of supply and high prices. Therefore, many non-electrified VDCs have already availed of Pico PV systems.

In view of impending electrification either through national grid or micro hydropower projects in the vicinity, Pico PV may at best be looked as interim measure or for mobile applications such as battery-powered lanterns. Consequently, the financial instruments for this may also suffer instability in such areas. Many of the instruments described below, therefore, may be useful with the entire VDC population in mind rather than individual HHs.

Possible Innovations

a. Advance Market Commitment model: The leaders in the community (e.g. VDC chairperson) unite the HH owners and give assurance to the selected vendor that all the HHs will buy the Pico PV system from them. As described above these commitments could be in written agreements through independent agencies like the AEPC. This will help reduce the market risk for the manufacturers thereby bring down the cost to a certain extent.

b. SACCO Model: As for the metallic ICS, the model can be worked out for Pico PV systems, which have around same costs. Again as mentioned earlier, awareness about SACCOs (and MFIs also) needs to be spread through campaigns.

c. Output-Based Aid: In case of the Pico PV systems, the manufacturing is done in organized sector. Besides, since the PV systems and components may not be manufactured in Nepal this amounts to assembling of the imported individual components. The GoN may introduce time-bound subsidies for such systems which would be provided in the form of Output-based Aid to the assemblers based on providing evidence of installation. However, as these cannot meet 100% cost of the systems, for the owners' contribution above mentioned SACCO model may be resorted to.

d. Leasing: Similar to the case of ICS, leasing is another method for financing Pico PV as well. In this model a private company can buy the Pico PV system on behalf of the HHs and receive the subsidy as applicable from the AEPC. It will then take the responsibility of installing the system and also periodically maintain it for a rent that enables it to earn reasonable margin. While this is a plausible model, it can be for a limited period as in the end it will be expensive for the HH.

e. Deprived Sector lending: Similar to the metallic ICS, this too can qualify as investments in the deprived sector. The MFIs and banks may prefer financing these devices to meet their targets under this.

3.10. Validating the pre-defined conceptual framework of Innovative finance

SNV has suggested a conceptual framework for the financing of kitchen improvement activities. Under this, the investments will be scaled up by including better kitchen in addition to the ICS. The increased investment potential may be attractive to the investors as the transaction cost would be spread over larger base. Further, the framework proposes to involve the social impact fund. The ICS project is an ideal investment for the same. It is understood based on the consultation with the CEDB that vendor financing could be best available option for providing finance under the scenarios in which the size of investments would be raised. The CEDB could avail concessional loans from investors like Althelia Ecosphere Fund or other social impact funds.

Under this vendor financing model, the CEDB will provide a working capital (as loan) to micro and small enterprises as well as private sector/NGOs and local partner organization (LPO) of the improved cookstove supply chain and the vendor (i.e., micro and small enterprises, NGOs, LPO etc.) will sell ICS to users on credits. In this way, the vendor increases sales, earns interest, and may sometimes also acquire an interest in the customer (ICS users). Under the conceptual framework, the social impact fund could provide a concessional loan of 5 million Euro to the CEDB. Out of this, 2 million Euro will be used to create a credit fund to the users for replacement and repair and maintenance of the ICS and 3 million Euros will be used for vendor financing as described above.

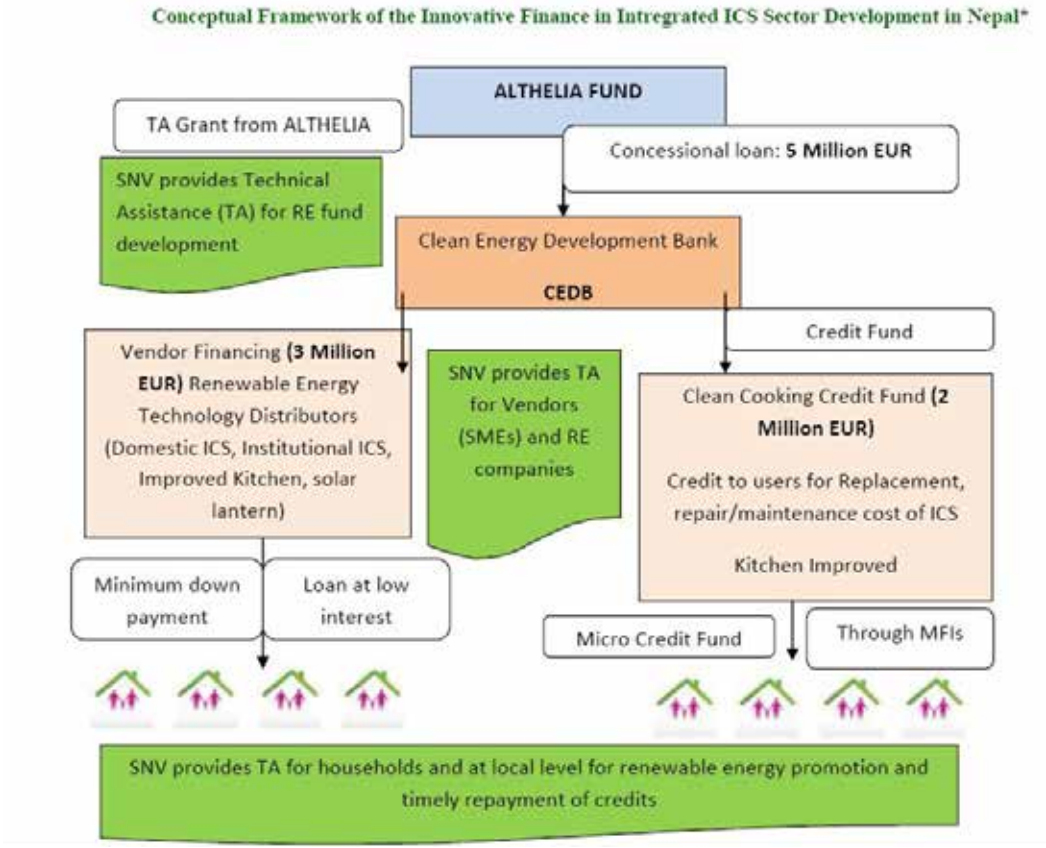

Conceptual Framework of the Innovative Finance in Intregrated ICS Sector Development in Nepal*
ALTHELIA FUND
TA Grant from ALTHELIA
Concessional loan: 5 Million EUR
SNV provides Technical Assistance (TA) for RE fund development
Clean Energy Development Bank
CEDB
Credit Fund
Vendor Financing (3 Million EUR) Renewable Energy Technology Distributors (Domestic ICS, Institutional ICS, Improved Kitchen, solar lantern)
SNV provides TA for Vendors (SMEs) and RE companies
Clean Cooking Credit Fund (2 Million EUR)
Credit to users for Replacement, repair/maintenance cost of ICS
Kitchen Improved
Minimum down payment
Loan at low interest
Micro Credit Fund
Through MFIs
SNV provides TA for households and at local level for renewable energy promotion and timely repayment of credits

Figure 30

The model has been worked out well. An issue that needs to be addressed is the credit cycle that needs to be completed. The model is clear on how the loan will flow from the CEDB to vendor and then to the user, but it is not apparent how the loan is expected to be serviced. While there could be provisions in case of commercial ICS installations, in case of individuals, ultimately the users (HHs) have to return the principle and also pay interest on the loan during its tenure. Secondly, the nature of kitchen improvement activities has not been detailed out in the note. The acceptability and willingness of the ultimate HH to spend for these purposes is yet to be assessed. The mechanism needs to clarify the risk sharing mechanism, i.e. who and how the default risk will be addressed. With these issues taken into considerations, there could be useful lessons learnt from piloting this mechanism.

In two of the three surveyed districts within lower income bracket, between 75 – 92% of the surveyed HHs showed interest in improving kitchen and between 54 – 83% of these respondents were also interested in contributing financially. Surprisingly, in the third district with comparatively higher monthly income and savings, only 44% HHs are interested in kitchen improvements with only 36% being ready to contribute. Thus, the kitchen improvement model suggested is more likely to succeed in lower income group districts. However, this may need testing through additional surveys in more districts before implementation as this somehow appears contrary to logic. This study also considers that MFIs, SACCOs and cooperatives should be involved in the dissemination process. There is scope for initiatives to consider leveraging funds available from banks under the deprived sector lending requirements for the commercial banks.

3.11. Recommendations

3.11.1. Summary of feasible financing mechanisms

As discussed in the previous chapters RETs have taken off with the available financing from government funds, donors and the private sector. With the formation of NRREP and the CREF it is likely that the sector will be more organized and regulated. It is felt that amidst limitations on resource availability, prevailing poverty, difficult terrain and lack of technical knowledge, the promotion of RET or development in general will be slow.

The Table 6 below exhibits the most appropriate financial models that were derived from study of literature, meetings with key stakeholders and field surveys in three districts. The references to the RETs are based on the assessment of their applicability to the assigned RETs.

Table 6: Feasible financing mechanisms for ICS, Solar Pico PV and Community Electrification

Financial Mechanism/model	Applicable to
SACCO	Mud ICS, Metallic ICS, Pico PV
MFI with deprived sector lending	Metallic ICS, Pico PV, community electrification
Project finance, PPP	Community electrification
Leasing	Metallic ICS, Pico PV
Advance Market Commitment	Metallic ICS, Pico PV, community electrification
Output based aid	Pico PV
Vendor financing model (SNV)	Metallic ICS with kitchen improvement

Some of the above mechanisms have been implemented in different areas/sectors and by different agencies. A sharing of knowledge and experience on such programs will help a lot in future.

Based on the experience of off-takers, domestic financial institutions and key government departments the following three innovative mechanisms are recommended. It may be noted that innovation could be also in utilizing the prevailing financial mechanisms in the country for the benefit of promoting RETs in a focused manner.

3.11.2. Recommendations of selected mechanisms and models

The recommendations made in this section are based on the potential of funds, possible coverage of RET devices and likely impacts that this study has noted following the secondary literature review, selected consultations with key stakeholders and field assessment. This section draws recommendations based on the findings and analysis carried out in earlier sections.

A. SACCO/MFI with Deprived Sector Lending Funds

a. Rationale

The larger size of funds available under the deprived sector lending schemes can cover alternate energy sources like ICS, Pico PV and community electrification with micro hydro or other sources such as biomass that are qualified as beneficiary sectors. More recent programmes such as SREP have also suggested this model as a feasible potential source of funds.

As of January 2013, since the beginning of deprived sector lending practice aggregate loans under this category was NPR 33,088 Million. According to the report on "Supply/ Availability of Wholesale Funds for MFIs in Nepal: Challenges and Problems"[49] , around

50% of these funds are disbursed through Class D MFDBs and 6% through cooperatives. As the economy is growing, the commercial bank lending is expected to increase. Besides the NRB plans to raise the DSL limits to 5%. Therefore, the funds available from this stream will grow significantly, however, the fund, available for RETs will not be very low although the DSL also includes other sectors and sub-sectors. Even with a 5% DSL limit, available fund for DSL lending will be close to NPR 1,650 million which is a significant amount for developing the RE sector.

b. Recommendation

This model is appropriate for a wide ranging RETs. Given the above analysis, it is recommended that a syndicator or aggregator of the deprived sector lending funds from commercial banks can be formed. This would need a greater role of the NRB and the proposed MFI authority, in licensing and supervision. The mechanism has been described in section 3.4 b The Fund volume would be sufficient to finance a large number of micro-hydro power projects. The fund availability would be even more for the HH devices like metallic ICS and Pico PV systems. The commercial banks lend deprived sector loans at an interest rate between 5 – 8% p.a. The syndicator or aggregator of the fund can get a spread of 2-3% and charge the MFI/SACCOs 7 – 10% rate of interest, who in turn can lend the funds at 13 – 16% p.a. to the user HHs or communities. These rates are reasonable in comparison to those prevailing today.

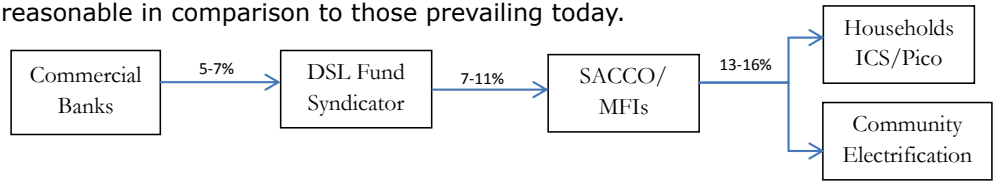


Figure. 31

The above model can be piloted in consultation with few commercial banks, NRB, AEPC and donors.

49.Supply/Availability of Wholesale Funds for MFIs in Nepal: Challenges and Problems Nirdhan Utthan Bank Ltd. February 2010

B. Vendor Financing Model

a. Rationale

The SNV under the REAP project has conceived a novel vendor financing model. Under the model, the ICS concept has been further expanded to modernization of the kitchen to address the problems of indoor pollution and impacts of unclean and unhygienic kitchens on health. Owing to the micro-scale technology and the relatively low cost appliances, ICS sector is not attractive for investors. This is particularly true for standalone ICS deployment at household level. Hence, the unit volume of financing is not attractive as for an investment firm, as the transaction cost for providing finance will be more than the appliance cost.

b. Recommendation

It is recommended that the vendor financing programme suggested by SNV can be undertaken. As described earlier, the programme suggests a transformational change from ICS to improved kitchen and/or commercial cooking solution, then the unit financing volume for one Kitchen and/or commercial ICS unit will be in between NPR 7,500 (75 EUR) to NPR 15,000 (150 EUR). This sounds very attractive for investor to finance. Three proposed financing plans, which depend on a small portion from carbon funding, vendor financing through Clean Energy Development Bank and users' contribution are

suggested. During the field survey conducted by the study team, there was recognition of the smoke and hygiene problems in the kitchen by a majority of HHs. Many also expressed willingness to bring their contribution to partially meet the cost of the kitchen improvements.

Therefore, it is suggested that the proposed vendor financing model be tried in a demo project. As the survey did not cover the commercial kitchen, which is in the Option C, hence the proposed financing option B should be adopted in the demo project.

C. Project Finance for Micro hydro power projects

a. Rationale

As mentioned previously, project finance or PPP has not been tried at the micro-hydro project level. Even the SREP also looks at projects at mini or small hydropower scale. However, project finance or private sector intervention in financing micro-hydro power projects would provide a boost for their offtake. The major hurdle in attracting private investors is the very small size of individual community electrification project. One way to address this issue is to have bundle of micro hydropower projects in a district. This will be acceptable to banks (or MFIs) as it will increase the size of the transaction, thereby spreading the administrative costs. It will also be possible to monitor the performance of the projects closely.

b. Recommendation

It is recommended to introduce project finance through a demonstration project. The demonstration project needs to be prepared carefully as the transaction cost may be high. Depending on the availability of water resources in a district micro hydropower projects should be bundled up and the bundle should be offered through a solicitation from private investors. Depending on the initial request for qualification the actual model i.e. PPP or IPP can be decided.

In addition to the above recommendations, Nepal should also bring the national banking system to the domain of innovative finance. The plausible financing instruments for the banking system of Nepal could be summarized below (Source: IFC, 2010).

c. Project Finance

Banks in Nepal have recently started adopting this financing modality. This mechanism is suitable for projects with high investment cost. Hence, it is suitable for cement, rolling mills, steel structures, and tourism (hotels) sectors. Most of the hydropower financing comes under this mechanism where viability, project collateral and cash flow of the project are the main basis for lending. With the establishment of a guarantee fund, limited resource project finance could be adopted for promotion of energy efficiency interventions.

d. Revolving Fund

Revolving fund is another mechanism which is appropriate for all industrial sectors for energy-efficiency intervention. Many industry leaders are still not committed and confident to invest additional investment only in energy efficiency/renewable energy options. One revolving fund could trigger the sector and can be used by most potential industries one by one, thus creating a demonstration effect. Further, this mechanism would help cover the perceived risk and encourage new players to invest in energy efficiency/renewable energy technologies.

e. Guarantee Fund

Guaranteeing the loan of financial institutions by a third party is a reliable and effective mechanism to encourage the industrial sector to invest in sustainable energy interventions. Winrock International has promoted this financing mechanism in the past to bring electric vehicles (EVs) and establish Rural Information Communication Centres. These are two successful case studies in Nepal to support the loan guarantee mechanism. One of the initiatives of IFC in China, "Risk sharing guarantees in China with Industrial Bank," has also shown the positive impact of such a mechanism. This mechanism has proved to be successful in new sectors such as EVs (Refer Case IV) and Information and Communication Technology. Thus, it is appropriate for those sectors or technologies where banks have not yet invested.

f. ESCO Financing

One of the financing mechanisms used widely across the world is Energy Services Company (ESCO) financing. ESCO is a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities. ESCOs guarantees achieving at least a specified amount of energy in the energy efficiency projects they implement.

Principal services offered by ESCOs include a) designing energy efficiency projects; b) arranging financing for energy efficiency projects developed by the ESCO; c) installing and maintaining energy efficiency equipment associated with the projects; d) monitoring and verifying energy savings. In this process ESCOs assume the performance risk related to guarantee of energy savings. The facility owner pays a certain amount per month upon implementation of projects by ESCOs. However, due to the lack of local service providers and donor-funded capacity building for energy management services, ESCO mechanism is not currently in practice in Nepal. Therefore until Nepal develops a mature market of energy service providers, ESCOs financing mechanism may not be suitable.

CHAPTER 4
CONCLUSION

4.1. Key Issues-Analysis

Based on the above mentioned illustration, it is necessary to examine the applicability of innovative finance into the context of development. This analysis has been made based on the following key questions-

1. Does innovative financing for development initiatives generate additional resources for renewable energy sector?

Several initiatives do, in principle, raise additional revenues for development. These include taxation instruments such as the airline ticket tax, carbon trading schemes and voluntary solidarity contributions such as Product. For other innovative initiatives, the creation of new and additional revenues for development is not their aim. While some initiatives do aim to generate new revenue streams for development (e.g. the airline ticket tax and the two percent levy on CERs), overall, current evidence points to limited 'additionality' in innovative finance—although some initiatives have enabled donors to increase their ODA. To date, innovative finance mechanisms have played a more significant role in supporting financial solutions on the ground than in identifying and exploiting "alternative sources of ODA." Most innovative finance schemes have instead leveraged or 'manipulated' ODA in one form or another.

2. Have innovative financing initiatives promoted actual development?

It is important to note that assessments of development and environment impacts are subject to a high degree of uncertainty and results may be better—or worse—than those estimated. The availability of quality and comparable data across countries is one factor. It can also be difficult to attribute a development outcome to any one single intervention since progress (deterioration) in one area is often influenced by progress

(deterioration) in other areas (UNDP, 2010). It is also difficult to know whether a particular intervention financed through an innovative finance mechanism may have happened anyway, i.e. beneficiary governments may have diverted funds from another area to fund immunization anyway or found the resources through efficiency saving measures.

The drive for immediate and reportable development results, while important, needs to be looked at in a balanced manner; solutions on the ground often take some time to materialise. This means that innovative financing initiatives should be reviewed in terms of their ability to efficiently and effectively deliver development results both in the immediate and longer-term. There is a risk that the results-based approach which is currently popular in the development discourse could lead the international community to focus on 'low-hanging fruit' or 'quick wins' at the expense of longer-term development challenges (such as local capacity development) or perceived riskier interventions. For instance, interventions may focus on relatively simple, inexpensive initiatives (e.g. distribution of anti-malarial insecticide-treated nets), rather than more complex, expensive and longer-term interventions (e.g. empowerment of women). Such interventions frequently require long time frames for tangible impacts that mostly occur in the next generation (Richard et al 2011).

Broad public support for innovative sources of development finance will determine their relative success or failure. This popular support will hinge, to some extent, on the initiative's abilities to secure results. However, this may present challenges for programmes which take a longer-term view. Thus, it may be useful to consider the ways in which innovative sources of development finance could complement and/or be blended with other forms of finance—domestic and external, official and private—to ensure both short and long-term objectives can be met. This will require close alignment behind nationally-devised development and climate change strategies **(see question five on country ownership of innovative sources of development finance for further elaboration).** - Innovative Financing For Development: A New Model For Development Finance? UNDP-2012

3. Have innovative financing for development initiatives supported capacity development?

Innovative finance does not necessarily support the capacity development activities. In most of the currently available innovative finance mechanism, it is required to find a separate fund for capacity development and technical assistance. Very often, this provision makes the viability of the innovative finance doubtful.

A country's successful development hinges on having sufficient capacity. Financial resources are vital, but they are not sufficient to promote and sustain human development. Without supportive national development strategies and policies, well-functioning institutions and administrations, effective laws and procedures and educated and skilled people, countries lack the foundation to plan, implement and review their national and local development strategies. Put simply, it is about the 'capable institution' that is able to better achieve its mandate (UNDP, 2009). To ensure that development results are sustained and can be built-on over time, innovative financing for development initiatives should therefore support, not undermine, the development of local capacities. It is important then to look at the record of different initiatives in this area.

The development of local capacities is the key to ensuring that development results are sustained over the longer-term. Innovative financing for development initiatives should therefore use recipient country systems to the maximum extent possible and standalone project implementation units should be discouraged; if national systems are not strong enough, they should be reformed and strengthened, rather than bypassed (UNDP, 2009).

4. Can innovative financing for development be scaled up and/or initiatives replicated in other development areas or regions?

The sheer scale of resources required to fund development and meet the challenges of access to clean energy are such that innovative finance mechanisms which demonstrate significant potential for scale and/or that may be easily replicated are especially attractive and warrant further exploration[50]. Large-scale initiatives may also help to reduce the significant transaction costs associated with many small initiatives. Some initiatives demonstrate more potential in this regard than others.

As it is clear from the innovative finance schemes implemented so far, even small programmes have taken time to negotiate and come to fruition—and most have failed to attract broader political and/or financial support. Thus, despite the potential shown by many initiatives, the difficulties associated with reaching an international agreement to implement them in a coordinated manner should not be underestimated; coordinated action typically requires years of international negotiation followed by domestic action. This reality means that the implementation of smaller schemes by individual countries, 'like-minded' countries or regions is the more likely scenario in the future.

4.2. Innovative Finance in the context of SNV's Business Operations

In the renewable energy sector, SNV has been working mainly for providing access to domestic cooking and lighting energy sources. Indeed, the focus has also slightly sharpened with the inclusion of off-grid solar and community electrification with micro and pico hydro and waste to energy sub-sector. Hence, SNV needs to focus at the End-User Finance so that the clean and renewable energy systems are becoming increasingly reliable, available and affordable both in absolute terms and also relative to most popular fossil-fuel alternatives.

50. Innovative Financing For Development: A New Model For Development Finance? UNDP-2012

However, high upfront costs compared to traditional fuels, low purchasing power of poor people and lack of viable RET financing mechanisms are still major barriers to dramatically scaling-up access to clean energy in most of SNV countries. To help finance the remaining cost of the systems financial innovative in the form of credit schemes are necessary. SNV needs to work with commercial banks to introduce loans for end-users so that loans and credits are bearable for users with low interest and thereby reducing transactional cost.

Hence, it is pertinent for SNV to take up a few small pilots in SNV countries from all three continents (where SNV works). These pilots shall aim to work with key financial service providers so that credit and loan can be provided to low-income households and micro-entrepreneurs. This intervention shall also target private sector (wholesalers and retailers) which will eventually influence the supply chain of RETs. In this context Nepal's vendor financing example will be useful.

4.3. What Next?

SNV has recently become involved in the development and implementation of an innovative finance pilot for renewable energy solutions in partnership with the Clean Energy Development Bank, Nepal. The goal is to design a range of innovative financing mechanisms for the renewable energy sector with a particular focus on the domestic cooking and lighting markets where SNV is already intervening.

Key activities under this pilot program involve conducting field based assessments to understand renewable energy users' perceptions and preparedness for new financing methods, and evaluating the applicability and readiness of various result based finance instruments in the domestic cooking and lighting markets in Nepal. The intervention,

which aims at transforming the domestic lighting and cooking subsectors into self-sustaining and commercially viable ones, sets out to address two major gaps, namely the absence of a well organised distribution chain and poor access to financing at wholesalers, distributors and retailers level. It will lead to the creation of commercial partnerships between the four key players in the supply chains of stoves and lighting solutions in Nepal.

It is expected that the pilot will result in a fully tested and peer reviewed financial innovation that includes an effective result-based component. This mechanism will eventually be included in the full-fledged SNV programs that seek to catalyse ICS and other renewable energy products dissemination by promoting improved distribution networks, ultimately meeting the consumer's cooking and lighting needs.

The key inputs of such programs revolve around the supply chain. Among other activities, they include mobilizing private sector funding with results-based finance as an incentive; brokering and formalizing business relationships amongst manufacturers, wholesalers and retailers; promoting proper use of quality stoves and solar lanterns at the domestic level; and developing an enabling business environment for private sector actors at the national and sub-national levels through innovative sales strategies.

Ultimately, the hope with this financial program is to transform the aid or subsidy driven renewable energy sector of Nepal into a commercially viable market-place with private sector investment. The completion of the pilot should yield truly commercial and self-propelling cooking and lighting sub-sectors which attract private investment and debt or credit from financial institutions for a widespread and sustainable dissemination.

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