Background Paper
For Clean Cooking Market Place 2013, Nepal

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BACKGROUND & CONTEXT ANALYSIS

Out of 5.43 million families in Nepal, 4.50 million (83%) live in rural areas and most of them have no access to any clean cooking energy. These households are using fuels like firewood, cattle dung or agro waste in traditional three-stone or metal tri-pod stoves. Roughly 1.78 million households are using some kind of clean cooking energy like Improved Cookstoves (ICS), biogas, kerosene, LPG and electricity. This figure is obtained by adding an estimated 450,000 households using ICS and around 1.33 million households using cleaner fuels like biogas (131,596), kerosene (55,610), LPG (1,140,662) and electricity (4,523)[1], as primary cooking fuel. Thus, roughly 3.65 million rural households are cooking in traditional stoves with fuel like firewood, dung and agro-waste and almost 2.85 million households may qualify only for ICS at least in short term and some 800 thousand households may qualify for domestic biogas, particularly those currently using cattle dung for cooking (563,126)[2]. Of course, solar cookers can be promoted as cooking energy solution in some mountain districts, where firewood is really scarce and biogas is also not feasible.

Globally, around 3 billion households still cook in smoky kitchens and hence household air pollution has been the 4th biggest cause of pre-mature deaths with estimated 4 million people dying per annum, globally and around 7,500 per annum in Nepal. The number of user of solid cooking fuels in inefficient traditional stoves has remained almost the same globally for the last 3 decades, and promotion of a rather simple product that has a better efficiency like an Improved Cookstove has been a challenge for the world. Besides the health problem emanating from household air pollution, perennial use of traditional fuels like firewood, cattle dung and agro-waste burnt in traditional stoves also result drudgery, mainly for women and children, as well as deforestation and climate change.

Nepal has made quite a name among the developing countries in promoting decentralised, alternative and rural/renewable energy solutions. The Nepal model is characterised by a multi-stakeholder approach with public-private partnership and a good combination of technical assistance for capacity building, quality assurance, etc. limited investment subsidy and increasingly better linkage with credit. Different internal and external development partners, including donors have been very much part of the design, testing and scaling up of the models and have been increasingly supportive to the government's leadership in development of the sector. The biogas and micro hydropower projects of Nepal have been exemplary and the biogas programme, in particular has been replicated in many countries in Asia and Africa.

The national ICS programme has been able to bring ICS to some 67 districts out of 75, with a cumulative installation figure of around 650,000 units so far, mostly with mud ICS with chimney. The national ICS programme and other smaller programs or projects have developed awareness and capacity, particular with national, regional and local NGOs across the country and with this, currently around 100,000 ICS are being installed annually. However, quality assurance and continued functionality have been challenging as the stoves

[1] Census 2011 Report
[2] Census 2011 Report

are with simple design, in-situ construction from mud and cheap. The national programme has limited to few designs, which leaves people using cooking fuel other than firewood out of the programme.

At the global level, United Nation's Sustainable Energy for All by 2030 and other follow up initiatives like Energy + and Energy for All Partnership very much target to address the problem. In view of this staggering number and that is not decreasing any time soon and the global problems created by this perennial energy poverty, there is a more focussed and pragmatic global initiative called Global Alliance for Clean Cookstoves (GACC), which has set a goal of catalysing 100 million households adapt clean and efficient stoves and fuels by 2020, is very likely to include Nepal as a priority country after 2014. And Nepal is making serious effort to make it happen so that it gets the international spotlight as well to effectively augment the on-going efforts. Besides support for general sector support, capacity development, support for standardisation and testing, GACC also undertakes direct investment to spur private sector investment and investment brokering between green or impact investors and local private sector for clean and efficient stove and fuel market development.

All these initiatives create an opportunity for development partners, including private sector to make a big dent in shortest time possible, breaking away from the traditional developmental approach to more market oriented and sustainable as well as scalable one. Nepal has well prepared itself for this transformational change that too in a big scale.

CURRENT PROGRAMMES & INITIATIVES IN NEPAL

The Alternative Energy Promotion Centre (AEPC) a semi-autonomous government body under the Ministry of Science, Technology and Environment (MoSTE) is currently executing a framework programme called National Rural & Renewable Energy Programme (NRREP) with support from external development partners. This 5-year programme that started from July 2012 is an integrated avatar of different smaller programmes or projects. NRREP is being funded by the governments of Nepal, Denmark, Norway, Germany (KfW) and the United Kingdom (DFID) and UNDP, SNV and GIZ are providing technical assistance. NRREP has an initially committed budget of around US $ 164 million for different technology linked components (community electrification, biomass, biogas and solar energy) as well as other support components on business development and productive end-use, institutional development, subsidy and credit financing. The targets include 475,000 ICS, 130,000 domestic biogas plants, 7,500 solar cooker/dryer, 600,000 Solar Home Systems and community electrification for 150,000 households through generation of 25 MW from micro hydropower plants.

Besides NRREP, another programme called Scaling up Renewable Energy Programme (SREP) under the Climate Investment Fund (CIF) is also being launched in Nepal to support waste-to-energy or biogas plants for institutions and municipalities, communities and businesses and micro and small hydro power with solar PV systems with a total funding of US $ 20 million and expected leverage of 4 times of the that amount3. The CIF funding is being channelled through ADB and the World Bank. This makes the total budget of US $ 184 million in the alternative and renewable energy sector in Nepal.

Other development partners are supporting AEPC even beyond the targets and budgets specified under NRREP. SNV the Netherlands Development Organisation has launched an Improved Cookstoves Programme with Carbon Finance (ICF) under the framework of NRREP. ICF has a number of key features including a focused and cluster approach, technological development, market led dissemination and carbon financing. The programme aims to cover 150,000 families during 5 year phase I period, starting from July 2012 in 7 hilly districts of the Far-Western

[3] SREP Investment Plan for Nepal 2012

Development Region[4]. In recognition of the quick success in development and deployment of an innovative approach under ICF, partners including AEPC have appreciated and applauded SNV for its contribution in further development of ICS sector in Nepal.

Some other local and international organisations are also supporting AEPC by launching different ICS programmes often with carbon finance approach in different clusters of Nepal. Given these initiatives and their successful demonstration in addressing the challenges posed by perennial use of traditional fuels burnt in traditional stoves, the Nepal government has recently announced an ambitious national goal of "Clean Cooking Solutions for All by 2017". Following suit, some 2 dozen District Development Committees (DDCs) have already announced their respective districts to be "indoor air pollution free" by 2017 or even earlier.

In the meantime, 2 state-of-the-art cookstove testing labs have been installed in Nepal. Global Alliance for Clean Cookstoves (GACC), has supported Centre for Rural Technology, Nepal (CRT/N) for a Regional Testing & Knowledge Centre (RTKC) with Laboratory Emission Measurement System (LEMPS) and GIZ/NEEP has supported Renewable Energy Testing Station (RETS) under the National Academy of Science & Technology (NAST) to set up a Portable Emission Measurement System (PEMS). The ISO interim standards for ICS are being used by the labs. In recent review of the government subsidy policy, subsidy provision for ICS has been expanded to different types of ICS designs for domestic and institutional uses.

These programmes and initiatives with increasingly larger financial commitments from the government and external development partners is a clear sign of coming of age in the renewable and alternative energy development in Nepal with conducive policy and institutional frameworks in place.

There are some private sector initiatives focusing on promotion of ICS, mostly in urban areas targeting small like business like fast food restaurants as well as domestic use in cooking, space heating, etc. Some of them are already tied up with foreign stove manufacturers. These innovative and green companies are elated by such developments in the public sector and the opportunities arising out of burgeoning price of petroleum products as cooking fuels, mainly LPG. Taking away government subsidy in LPG for commercial use, starting from mid July 2013, will be another boon for promotion of ICS with firewood or other biomass based fuels like briquette, pellet or charcoal.

Some international carbon buyers or developers are already working with local partners for ICS programmes with carbon finances. Given high potential of carbon revenue from ICS programmes, there are a number of carbon projects or programmes at different stages development or implementation.

RATIONAL & OBJECTIVES OF THE MARKET PLACE

The stage is thus well set for aggressive promotion of ICS in different market segments with an increasingly higher focus on private sector participation for sustainability and scalability in no time. This does not however mean that other development partners have no or less role in coming days in this national endeavour. AEPC's multi-stakeholder approach of involving governmental and non-governmental organisations, community organisations, private sector actors, including financial institutions, cooperatives, etc. must and will continue. It is just that role and degree of involvement of these different actors will vary primarily depending on the segment and stage of market development.

Despite all these successes and initiatives lined up, the clean cooking sector(s) needs a shot in the arms, particularly in terms of attracting more private sector involvement and investment so that a more market

[4] ICF Programme Implementation Document 2012

oriented sector development takes place with a faster pace and sustainable approach so that the ambitious goal is achieved and sustained. AEPC is thus organising a "Clean Cookstoves Market Place" in Kathmandu from July 10 to 12, 2013 with SNV as a co-host, focussing on ICS sector and with the following objectives:

- To showcase the successful ICS designs and business models and provide platform for exploration of 'business to business' opportunities between international-national, national-national and national-local entrepreneurs,
- To explore the investment opportunities and identify possible means to facilitate linkage between ICS entrepreneurs and financing institutions,
- To launch "Nepal Alliance for Clean Cookstoves (NACC)": a national level alliance that works as an affiliate of GACC. NACC will work with a strategic intent to achieve the national goal of "Clean Cooking Solutions for All by 2017", thereby giving a clear national framework for all actors to contribute and take advantage of this unique opportunity.

CLEAN COOKING MARKET SEGMENTATION & OPPORTUNITES

This section attempts to simplify the different existing and potential clean cooking market segments in Nepal. This exercise is basically carried out to see what different segments can be thought of and what different business and developmental opportunities exist, to develop the markets and sustain them, while making them work for the poor as well.

The Table 1 below presents a synopsis of distribution of household cooking fuel use in Nepal, as per the Census 2011 Report. If needed for further narrowing down, data is also available with further details per development region in each ecological region as well as per district.

Table 1: Number of Households by Fuel Types across Different Areas in Nepal (Census 2011)

Area	Total	Firewood	Kerosene	LP Gas	Cow Dung	Biogas	Electricity	Others	Not Stated
Nepal	**5,423,297**	**3,470,224**	**55,610**	**1,140,662**	**563,126**	**131,596**	**4,523**	**22,583**	**34,973**
Urban/Rural							1,332,391		
Urban	1,045,575	268,643	20,990	707,674	15,776	19,121	1,255	4,107	8,009
Rural	4,377,722	3,201,581	34,620	432,988	547,350	112,475	3,268	18,476	26,964
Ecological Belt									
Mountain	363,698	344,843	1,990	11,143	1,517	792	1,169	335	1,909
Hill	2,532,041	1,696,376	27,554	744,086	2,810	41,147	2,174	4,332	13,562
Tarai	2,527,558	1,429,005	26,066	385,433	558,799	89,657	1,180	17,916	19,502
Development Region									
Eastern Development Region	1,230,743	749,311	12,251	167,083	255,205	31,390	1,587	7,099	6,817
Central Development Region	1,962,238	986,447	30,857	665,995	216,142	32,279	1,652	12,081	16,785
Western Development Region	1,065,599	696,683	7,540	234,539	80,543	38,419	849	1,787	5,239
Mid-Western Development Region	695,014	609,933	2,510	53,623	10,478	13,857	345	881	3,387
Far-Western Developent Region	469,703	427,850	2,452	19,422	758	15,651	90	735	2,745

The Table 2 below defines 7 generic user or market segments currently existing in Nepal and their sizes, basic characteristics as well as potential interventions needed to create business and development opportunities. The sizes of the first 6 segments are obtained from Table 1 and the last 2 are estimated based the Table 1 and assumption of some 450,000 ICS users in 2011.

Table 2: Current Market Sizes, Basic Characteristics and Opportunities in Clean Cooking Market Segments

S. No.	Market Segment (Fuel Use)	No. of Households[5]	Basic Characteristics of Users	Interventions/ Opportunity
1	Urban Rich (electricity/LPG)	708,929	They are rich to super rich and having more than one cooking fuel or stove. They are in service or business.	The market is working and no intervention needed, particularly until subsidy is removed from LPG for domestic use.
2	Urban Middle Class (biogas)	19,121	They are rich but still active in agriculture, some switching to service and trade as well. Some of them also have LPG as a standby option.	Biogas may not operate too long as keeping cattle becomes difficult. They are highly likely to switch back to good quality ICS with quality fuel like charcoal or pellet.
3	Urban Poor (firewood, kerosene, dung)	305,409	They are poor but spend substantial amount to buy their cooking fuel.	They are ready to switch to ICS with firewood or better fuel like briquette. Subsidy is needed.
4	Rural Rich (Electricity/LPG)	436,256	They are rich people; mostly farmers but not keeping cattle.	They are likely to switch to good quality ICS with firewood or better fuel like briquette or pellet.
5	Rural Middle Class (kerosene)	34,620	They are from hill or Terai regions and close to towns and not having easy access to firewood.	They are ready to switch to good quality ICS with firewood or better fuel like briquette or pellet. Subsidy is needed. Kerosene is also subsidised.
6	Rural Middle Class (biogas)	112,475	They are farmers and keeping enough cattle for dung to feed biogas digester.	They need ICS as an alternative to biogas in the kitchen and outdoor use for fodder cooking or liquor making because some firewood is already available. Subsidy is not needed.
7	Rural Poor (with firewood in ICS)	450,000	This is an estimated figure out of the 660,000 or so households which already installed ICS. They are poor or not so poor but living in areas where firewood is in abundance.	Many of them are willing to have better ICS with firewood for their kitchen and for outdoor use for cooking fodder or liquor making. Some of them aspire to graduate to biogas or even LPG. Providing nice ICS with some subsidy will avoid LPG and save a lot.
8	Rural Poor (with firewood or dung in a traditional stove)	3,298,931	They are the bottom of the pyramid. Most of them do not qualify for anything except ICS, in short run.	This is dirty cooking! They do deserve at least ICS that is efficient enough, functional and cheap. The cost has to be further bought down by subsidising it.
	TOTAL	5,365,741		

Besides the domestic cooking fuel use, firewood is also used in great amount in thousands of public institutions like army or police barracks and thousands of family owned micro enterprises like road side restaurants along highways or trekking trails or in towns and cities. They are very much candidates for good quality ICS. Smaller restaurants in cities and towns that are currently using LPG are mostly likely to switch to good quality ICS, because the LPG subsidy is being taken out from mid July 2013.

[5] Census 2011 Report; except on the last 2 figures in the column.

Business opportunities do not just exist in fabrication, supply, installation and after-sale service of stoves but also in production and supply of fuels like briquette, charcoal and pellet. A number of organisations, including private sector companies are already into the business, particularly briquette.

ROLES OF DIFFERENT ACTORS AND PARTNERSHIP

The above analysis shows there are huge opportunities for all different public and private sector actors in capturing the business and developmental opportunities in the nation's shift towards clean cooking solutions. Some segments need a higher level of private sector involvement from day one while others will require a more gradual involvement as awareness and capacity building and other enabling environment is created with public funding, until the segment becomes attractive enough for private sector participation with decreasing level of public funding.

For the government – both at the national and sub-national levels, a lot of effort is needed to create enabling environment through facilitation, coordination, policy reforms, funding and programmatic supports, etc.

Private sector participation, including that of foreign stove manufacturers and investors is a must for technology transfer, innovative business models and financially strengthen local private sector participation for fast market development, expansion and scaling up. Local or international financial institutions have a role to finance the business in terms of loan investment for establishment as well as for working capital, including vendor financing. Micro Finance Institutions (MFIs) needs to come in with group base or individual micro credit and also vendor financing. Here, business to business linkages are important between an international and national or between a national and national companies or investor or financial institutions.

Role of NGOs and CBOs are obvious because an appliance like ICS or fuel like briquette or pellet targeted to people who are not rich. Additionally, the health and other problems associated with the use of firewood or dung in traditional stoves are not well recognised by the people. Donors and other international development organisations come in to support the whole development eco-system, financially and technically.

Let's take an example of the market segment "Urban Poor" who are using firewood, kerosene or dung and having a great potential to switch to a quality ICS. The potential market size is 305,409 households, spread mostly over some 10 or 20 towns or cities. This is definitely an attractive segment both from business as well as developmental perspective. Geres in Cambodia has supported deployment of 3 million ICS, so far in Phnom Penh city only. This segment needs NGOs at least temporarily for awareness creation and government for a number of promotional and regulatory aspects, including subsidy and quality assurance. Local private sector companies with necessary support from national or international business or investment partners develop an effective marketing strategy and supply chain. Banks and MFIs have to come in for credit financing.

A similar product and business model will be applicable for two other attractive segments; Rural Rich and Rural Middle Class (kerosene). Together these 2 segments have a market potential of 472,000 households. The commercial segment like restaurants along road sides or trekking trails or in cities and towns is also very lucrative, as market development will be easier due to the fact that the benefit from cost reduction is substantial. The same product will be useful for some other commercial purposes at household level.

Another but different example is the "Rural Poor" who are using firewood or dung in traditional stoves and they make up the biggest chunk of 3,298,931 households. This is most difficult but not impossible. SNV is currently targeting this segment in the poorest part of Nepal, 7 hill or mountain districts in the Far West. Even there, as mention earlier, SNV has successfully launched an ICS Programme with Carbon Finance (ICF) in partnership with government, NGOs and private sector from middle of 2012 to reach 150,000 households in 5 years.