

Country	Nepal
Request ID#	2016000022
Title	<i>Developing policy framework and business model to promote sustainable use of biomass briquettes in Nepal</i>
NDE	<i>Ram Hari Pantha Head Climate Change Section, Ministry of Population and Environment rhpantha@hotmail.com Singha Durbar, Kathmandu, Nepal</i>
Proponent	<i>Mr. Ram Prasad Dhital Executive Director, Alternative Energy Promotion Center (AEPC) info@aepe.gov.np Khumattar Height, Lalitpur, Nepal Post Box No.: 14364</i>

Summary of the CTCN technical assistance

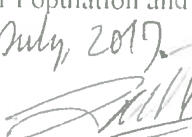
Nepal is heavily dependent on biomass for its energy needs. Efficient use of biomass in the form of briquettes/pellets can curb deforestation as well as mitigate GHG emissions. This CTCN Technical Assistance to the Government of Nepal through Alternative Energy Promotion Centre (AEPC) will assist with the development of a business model, policy framework and facilitate capacity building and knowledge sharing among all stakeholders for promotion and sustainable future of biomass briquetting in Nepal. It will also identify market barriers in the present system and suggest business and policy solutions. The outputs of the CTCN Technical Assistance will contribute to the formulation of the basic policy document for Nepal on the future use and market mechanisms required for enhancing biomass briquetting industry.

Agreement:

(If possible, please use electronic signatures in Microsoft Word file format)

National Designated Entity to the UNFCCC Technology Mechanism for which the Climate Technology Centre and Network is the operative arm

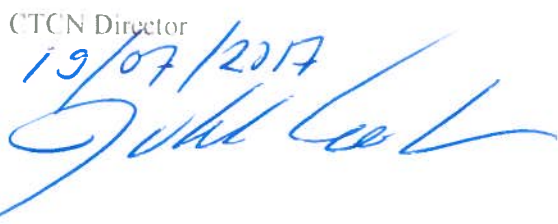
Proponent (signature of the Proponent is optional)

Name: Ram Hari Pantha
Title: Head of Climate Change Section
Ministry of Population and Environment
Date: 13 July, 2017
Signature: 

Name: Ram Prasad Dhital
Title: Executive Director
Alternative Energy Promotion Center (AEPC)
Date:
Signature: 

UNFCCC Climate Technology Centre and Network (CTCN)

Name: Jukka Uosukainen
Title: CTCN Director
Date: 19/07/2017



1. Background and context

To combat climate change, Nepal's Intended Nationally Determined Contribution (INDC) identifies carbon sequestration by increasing its forest cover as one of its alternatives to mitigate greenhouse gas (GHG) emissions. However, Nepal's population is highly dependent on biomass as 83.7% of the households use fuel wood for cooking. Traditional biomass represented 80% of total primary energy consumption during 2013-14.

Nepal is a landlocked country and depends primarily on India for its fossil fuel imports. However, the fluctuation of prices in the international markets as well as changing regional conditions have seriously impacted Nepal's energy sector. As a result, an ongoing fossil fuel crisis has created a demand for biomass briquettes in Nepal. Specifically for cooking purposes, urban and sub-urban areas of Nepal are dependent on imported liquefied petroleum gas (LPG) which is not sustainable or suitable for further up scaling to meet the energy demands. As a consequence and in order to meet the rising energy demand, a promotion of renewable energy and efficiency measures has been initiated in Nepal.

Nepal has abundant agro forest residues that can be used free of cost and need only collection such as Saal leaves, Bambara, pine needles etc. which can be suitable raw materials for briquette production. As a renewable fuel, biomass briquettes and pellets are suitable for household, commercial (army and police canteens, hospitals, schools and colleges, restaurants and hotels) as well as small to medium scale industries such as paper making industries, food processing, textile and clay products.

GHG emissions from the energy sector have increased from 8.4% in 1994 to 26.5% of total national GHG emissions in 2008. Direct burning of loose biomass is the common practice which is inefficient and causes large GHG emissions compared to the achieved heating value. Hence, improving efficient burning of biomass is critical for reducing GHG emissions in Nepal. Also, higher energy efficiency in the use of raw fuel wood can reduce the pressure on forests to supply fuel wood and thereby curb the deforestation rate. Nepal's forest cover in 2000 was 27.2% of its total land area and reduced to 25.4% in 2015. Additionally, inefficient in-door burning of biomass also causing local air pollution which has negative health impacts, especially for women and children. Transportation and storage is another challenge due to the very low energy density of biomass. To overcome the inefficient and excessive use of traditional biomass as well as exploit it as a renewable clean fuel, biomass briquetting can be considered. Biomass briquetting has already been tried out in Nepal since 1980s but it did not succeed because of number of challenges such as high costs of imported technology, fast wear and tear of equipment, high cost and seasonal availability of agricultural residues, problems of drying of raw materials (agricultural residues and product), absence of proper market linkage and easy availability of fossil fuels in past days. Therefore, now with evolving local and regional conditions, energy demand and security, emissions mitigation and climate change and use of renewable energy, there is a need to commercialize and recreate market for biomass briquettes and pellets.

2. Problem statement

Enhanced use of renewable energy is required for sustainable growth in Nepal. However many barriers, such as financial and market barriers, technical barriers, institutional and regulatory barriers need to be overcome before renewable energy can be utilized at a large scale. To promote efficient utilization of biomass, a strong policy framework and innovative business models are required to enhance national capacities and remove the above mentioned barriers. One key opportunity to enhance the efficient and effective use of biomass is to produce briquettes that make them attractive in terms of higher density, heating value and ease of transportation and storage.

Though biomass briquetting has opportunities, a financially sustainable business model is required to continually increase its production, market base, quality assurance and productive use. Therefore to promote the use of biomass briquetting this CTCN TA will address the following:

- Develop innovative and integrated business model to effectively stimulate and incentivize further supply and demand of biomass briquettes, targeting industrial level production and consumption.
- Develop an appropriate policy framework to create, sustain and further promote the biomass briquette industry in Nepal, taking into account all stakeholders.
- Capacity building and knowledge sharing among policy makers, manufacturers and financial institutions based on best practices and success stories.



<p>delivered (a template will be provided). iv) A closure report and data collection: filled at the end of the technical assistance (a template will be provided)</p>		<p>Deliverables 2: A consolidated report containing activity 1.1 to 1.4 in support of the business model and business action plan.</p>		<p>Output 2: Development of a policy framework for Nepal that will enable and support enhanced biomass briquetting production and utilization in an environmentally sound manner</p>		<p>Activity 2.1: Carry out a detailed review and analysis of regional policies for biomass briquetting production and utilization.</p>		<p>Activity 2.2: Analyze existing policies of Nepal and assess feasibility of new policies for enhanced and sustainable briquetting with stakeholders.</p>		<p>The existing policies with their effects on gender development will be studied and to address shortcomings and overcome barriers in the future business model and policy framework.</p>		<p>Activity 2.3: Analyze experiences, identify best practices and evaluate conditions required for successful flourishing of the briquetting industry in Nepal.</p>		<p>Activity 2.4: Prepare final policy framework for Nepal</p>		<p>Deliverables 2: Final consolidated report will be submitted addressing all the items under Output 2 and Activity 2.1 to 2.4.</p>		<p>Output 3: Capacity building and dialogue among policy makers, manufacturers, financial institutions and end-users based on the findings and recommendations from Output 1 and 2 as well as best practices and success stories from neighbouring countries and region. The capacity building will also prepare for the implementation of financial model and policy framework.</p>		<p>Activity 3.1: Conduct two trainings and one knowledge sharing and information dissemination workshop:</p>		<p>a) Training I: Training on best practices and technologies for production, storing and transportation of briquettes. Targeted participants - briquette manufacturers, equipment suppliers, industry representatives and others.</p>		<p>b) Training II: Training on economical aspects and benefits of production and utilization of briquettes. Targeted participants - end-users (household and industrial), women associations, financial institutions, NGOs, policy makers and others.</p>		<p>c) Workshop: Dissemination of key findings to all stakeholders and lessons learnt from practices and success stories from the region in promoting biomass briquette production.</p>		<p>The trainings will educate and train women who use biomass briquettes as well as produce carbonized beehive briquettes.</p>		<p>Using briquettes, reduces the time and drudgery in firewood collection among rural women. Further, using</p>	
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	stakeholder meeting)	3.2)	x 25 \$ (tea+lunch including venue)/person day = 1000 \$	(included in 1.2)	3500	
1.3 Formulation and design of business model and stakeholders meeting	- Experts =(2 man-days-technical expert + 3 man-days-energy economics expert) x 700 \$/man-day = 3500 \$ (Including one day stakeholder meeting)	(included in 1.2)	(included in 1.2)	(included in 1.2)	3500	
1.4 Developing business action Plan	- Experts = (1 man-day-technical expert+4 man-days-energy economics expert) x 700 \$/man-day = 3500 \$				19800	21000
Output 1 (Total cost)						
Output 2: Development of Policy Document						
2.1 Review and analyze of regional policies	-Policy/energy economics expert = 6 man days x 700 \$/man-day = 4200 \$	(included in 1.2)	(included in 1.2)	(included in 1.2)	4200	
2.2 Investigation of policies of Nepal and feasibility of new	- Policy/energy economics expert = 6 man days x 700	(included in 1.2)	(included in 1.2)	(included in 1.2)	4200	



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policy and stakeholders meeting	\$/man-day = 4200 \$					
2.3 Analyze experience and identify best practices	- Experts = (2 man-days -- technical expert + 3 man-days - Policy/energy economics expert = x 700 \$/man-day = 3500 \$					3500
2.4 Preparation of final policy document	- Policy/energy economics expert = 5 man days x 700 \$/man-day = 3500 \$					3500
Output 2 (Total Cost)						15400
Output 3: Capacity building and dissemination						
3.1 One knowledge sharing and dissemination workshop and two trainings (see the details in section 3.1)	- Resource persons (one technical expert and one policy/energy economics expert) conducting the trainings and workshops = 2 persons x 4 days/person x 700 \$/day = 5600\$	- International Travel = 2 experts x 1000 \$ (air fare+ accommodation+ per-diem)/person = 2000\$	- One knowledge sharing and dissemination workshop and two trainings(3 days (one day each) x 30 participants/day x 20 \$ (tea+lunch including venue)/person per day = 1800 \$	- Printing/photocopying documents, office supplies and others = 600 \$		10000
Output 3 (Total Cost)						12000

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Government of Punjab
Lahore
Sindhudhar, Kar...

Overall Cost

45200

49500

5. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
Biomass Technology Expert Energy Economics, Policy and Business Model Expert	Knowledge on different briquetting technologies; techniques; uses and best practices is essential to effectively carry out this technical assistance. Further knowledge of Nepal's energy situation and local technologies will help in formulating and selecting the most appropriate briquetting technology. Since this TA attempts to establish a sound business model and policy framework for Nepal, an expert on energy economics, policy and business models will be needed to supervise and successfully deliver this TA. The expert too should have a prior understanding of Nepal's social and cultural behavior to effectively judge and suggest workable business plans, schemes and policy framework




6. Intended contribution to impact over time

The CTCN Technical assistance will have the following impact over time:

- **Business Model:** A successful business model will promote local briquetting, income generation and poverty alleviation for rural Nepal. Further, active business models will also support start up local industries and production units. In the long run it will contribute to Nepal's GDP through the energy sector.
- **Policy Framework:** Successful implementation of policies will immediately reduce the deforestation rate and contribute to GHG emission mitigation from the Land Use, Land-Use Change and Forestry (LULUCF) sector. In future, these policies will conserve natural forests, along with the active use of sustainable clean briquettes as fuel.
- **Capacity building:** Knowledge sharing and success stories will highlight the best practices and efficient briquette making technologies and business models for sustainable production and consumption of biomass briquettes. In the future, these will be used as measuring scale for further improvement of briquetting technology, business model and policies for Nepal.

7. Relevance to NDCs and other national priorities

To mitigate climate change the Government of Nepal in its INDC submissions to UNFCCC has identified carbon sequestration by preserving its natural forests. About 30% of the total area is expected to remain under cover for carbon sequestration.

This CTCN TA will create a successful business model and policy framework to promote efficient usage of biomass. Further Nepal's 13th Year Plan set by the National Planning Commission has identified biomass briquetting as a green energy technology to reduce the use of fuelwood and move towards energy security. Nepal also recently launched the clean cook stove programme to promote clean and efficient cookstoves and use of briquettes for household cooking. Central Renewable Energy fund has also been set up to contribute to clean energy access among the people of Nepal. CDM and carbon pricing has been identified as a means of promoting biomass briquettes.

8. Linkages to relevant parallel on-going activities:

Screw extruder pyrolysed briquette making was established in a large scale in Nepal for rice husk based briquette manufacturers. The investments for the production company made or with financial support from banks. Initially rice husk was available for free, however, the price of the rice husk increased over time, making it difficult for briquetting industries and manufacturers to operate. Along with the rise in price of rice husk, the operation and maintenance cost over time of the apparatus increased, the technical man power too lagged, the market did not promise regularity in sales and the competition between manufacturers increased, leading to a shutting down of many such briquetting manufacturers and industries.

Today, Nepal manufactures non carbonized-high pressure compression briquettes and pellets, non carbonized-low pressure biomass briquettes, bee hives shaped carbonized briquettes, carbonized pellets etc. Nepal mainly uses the following technologies such as screw extruder and piston press. However, national manufacturing and research and development of briquettes technologies are essential to sustain the production.

Nepal also could consider similar skill development programs conducted in Bangladesh in the past such as south-south learning and matching program introduced under Asian Regional Research and Dissemination Programme of Swedish SIDA. Nepal can learn from its neighbor India in terms of financial and tax incentive packages to promote the use of biomass briquetting.

Nepal is in the process of designing next phase of National Rural and Renewable Energy Program (NRREP) which will be implemented from July 2017 and implementation document of investment prospectus prepared for clean cooking solutions in Nepal and some of the findings of this TA will assist in enriching this plan.



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Singha

9. Anticipated follow up activities after this technical assistance is completed:

The three outputs will be used as follows:

- The identification of the business model and establishment of a policy framework will act as a base that can be used to further accelerate the potential of biomass briquetting in Nepal depending on its future market and national and financial circumstances.
 - The policy framework will act as a guiding and leading pathway for Nepal to follow for its sustainable briquette/pellet production.
 - The capacity building and experience sharing will provide guidance to key stakeholders in Nepal on national and regional best practices for biomass briquette production.
- Furthermore, the workshop will enable networking between stakeholders and provide a platform for future communication on biomass briquette production in Nepal.

To ensure the continued success of the business plan and policy framework suggested for Nepal, a monitoring and evaluation agency needs to be set up or can be assigned to existing agency like AEPC. This body will be responsible for the quality assurance of the briquettes/pellets, layout laws (modifications if and when required) for the participating companies and its users. Further, this TA will also assist in shaping Nepal's next phase of NRREP starting 2017 and implementation document of Investment Prospectus for Clean Cooking Solutions for All.

10. Gender and co-benefits:

Imbedded in design of the activities:	Women's associations will be consulted to get their inputs and included in the experience sharing workshop so that their experiences and difficulties are taken into consideration.
Gender and co-benefits intended as result of the activities:	The use of briquettes/pellets in households will lead to cleaner kitchens and homes, thus improving the physical health of women and children. Also firewood collection time will be eliminated, giving women more free time and reducing their load of carrying firewood back home.

11. Main in-country stakeholders in implementation of the technical assistance activities:

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholder	Role in implementation of the technical assistance
Climate Change Section, Ministry of Population and Environment	Policy support, coordination with CTCN and other government organizations.
Alternative Energy Promotion Center	Lead implementing agency: Policy lobbying, stakeholder consultation, implementation, monitoring and evaluation.
Industries using briquettes	Participation in the TA as well as subsequently implement the business model resulting from the TA. Note: Presently, briquettes/pellets are consumed by small industries like pashmina, carpet industry, bakery, noodles, dairy, restaurants, campfires, catering and party palace. Briquette manufacturers have plan to supply to Distillery, Clay and brick industries in future. One of the future targets is to supply briquettes to industrial boilers and to replace LPG with briquettes



Manufacturers and suppliers of briquetting machines	<p>Participation in the TA as well as subsequently implementation of the business model.</p> <p>Note: Briquetting machines are imported from neighboring countries as Nepal do not have such manufacturers/ suppliers in the country. However, there are few local companies manufacturing tools/ equipment for production of charred beehive briquettes and pellets and small capacity non charred briquettes.</p> <p>It is expected that manufacturers and suppliers of the briquetting machine to orient their suitable products in the Nepalese market, give proper after sales service to the briquette manufacturer industries established in the country. Support in development of the local capacity for regular maintenance of the system as most of the existing briquette manufacturing companies in Nepal are facing problem related to smooth operation of the machine.</p>
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12. SDG Contributions:

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs/3SDGs)
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	The CTCN TA will support biomass briquetting and therefore provide access to sustainable, clean and modern fuel to the people of Nepal.
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	
13	Take urgent action to combat climate change and its impacts	The CTCN TA will support GHG reductions from the LULUCF sector and ensure higher energy efficiency of the applied biomass thereby contributing to mitigation of climate change.
	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	



	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	The CTCN TA will support the human capacity to climate change mitigation.
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	The CTCN TA will contribute to the reduction of deforestation.
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	Primary	Secondary
<input type="checkbox"/> 1. Technology identification and prioritization	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2. Research and development of new climate technologies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3A. Feasibility studies for specific known climate technology options	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3B. Piloting of known technologies in local conditions	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4A. Law, policy and regulatory reform recommendations	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4B. Sector specific roadmap or strategy design	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 5. Finance facilitation and market creation	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please note that all CTCN technical assistance contributes to strengthening the capacity of in country actors.

14. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation. The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation. Upon completion of all activities and outputs, evaluation forms will be completed by the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.

